

ESTIMATE-RELATED DISCLOSURES, INVESTOR MINDSET, AND  
THE ILLUSION OF PRECISION IN FINANCIAL STATEMENT ESTIMATES

BY

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DISSERTATION

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## **ABSTRACT**

This study examines the joint effect of disclosed measurement information and investor mindset associated with differences in temporal orientation on investors' judgments of estimate precision and firm value. Consistent with psychology theory, results reveal that short horizon investors adopt a relatively concrete mindset and long horizon investors adopt a relatively abstract mindset. As a consequence, disclosing that the recognized fair value of an impaired asset was derived from unobservable (i.e., level 3) inputs strongly influences short horizon investors' judgments of estimate precision. By contrast, disclosing this information has a significantly smaller impact on the precision judgments of long horizon investors. Additional analyses reveal that, in the absence of disclosure, investors attribute a relatively high default level of precision to a recognized estimate, suggesting that concerns about an illusion of precision may be justified.

Further evidence indicates that mindset and disclosed measurement information jointly influence investors' valuation judgments in a way that is inconsistent with statistical decision theory and standard models of firm value. Specifically, long horizon investors' valuation judgments reflect the negative effect of an asset impairment with no significant effect of differences in measurement. By contrast, short horizon investors' concrete mindsets lead them to interpret higher (lower) estimate precision as a positive (negative) signal about firm value in its own right. Thus, rather than placing greater weight on a more precisely measured estimate, short horizon investors' fixation on measurement causes them to disregard the negative effect of the asset impairment on firm value when it is measured relatively precisely, but amplify the negative effect in response to imprecise measurement.

A supplemental experiment uses an alternative manipulation of investors' temporal orientation to instantiate mindset, and tests the incremental impact of providing detailed quantitative disclosures for recognized fair values that are derived from unobservable inputs, as required by a recent update to US and international accounting standards. Results reveal that providing these additional disclosures strongly reduces the precision judgments of investors with a short-term orientation, but does not significantly affect the precision judgments of investors with a long-term orientation.

The theory and results presented here may be useful in judging the effectiveness of existing and proposed disclosures in communicating information about estimate precision. Further, this study makes a unique contribution to the accounting literature by providing theory and empirical evidence that investor mindset varies systematically with investment horizon, and influences investors' evaluation and use of accounting information in ways that are likely unanticipated by regulators and standard setters relying on standard economic theory.

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# CHAPTER 1

## INTRODUCTION

In this study, I investigate (1) the effect of disclosing the inputs and processes used to arrive at point estimates that are recognized on the face of financial statements (hereafter, “estimate-related disclosures”) on investors’ judgments of estimate precision and firm value, and (2) whether (and how) these judgments are moderated by a concrete or abstract mindset associated with investors’ temporal orientation.<sup>1</sup> I investigate (1) because of long-standing concerns that financial statements convey an appearance of precision that may obscure the vague nature of many accounting estimates. Further, the main regulatory response to these concerns has been to mandate disclosures whose purpose is, at least in part, to clarify the relative level of precision in recognized estimates. I investigate (2) because theory suggests that estimate-related disclosures will have a greater effect on the judgments of users who approach their evaluation of a firm with a concrete mindset compared to those with an abstract mindset. Moreover, investor mindset is likely to vary systematically with features of the investment context, including differences in temporal orientation arising from considering a short or long-term investment (i.e., investment horizon).

To elaborate, regulators and standard setters have long been concerned that an “illusion of precision” in recognized estimates could adversely affect the decisions of financial statement users (e.g., AIA 1932, SEC 2002, Glassman 2006). Specifically, the concern is that the appearance of precision may result in users failing to fully account for measurement error in their decisions as, e.g., capital providers. The principal regulatory response to these concerns has been to increase disclosure requirements, and as a result, financial statement users face a large and

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<sup>1</sup> I define estimate precision as the level of random error in measurement and, by extension, the level of uncertainty associated with the estimate’s true value (see Chapter 2 for a fuller discussion of estimate precision as a characteristic of accounting information). I define firm value as the fundamental or intrinsic value of the firm.

growing number of estimate-related disclosures (e.g., SEC 2002, Paredes 2003, FASB 2010). Many of these disclosures are intended, at least in part, to clarify the relative level of uncertainty in recognized estimates (e.g., SEC 1997; FASB ASC 715, 860 and 820 [FASB 2011a]). However, there is little theory-based empirical evidence regarding the effect of these disclosures on investors' beliefs about estimate precision, or on whether these beliefs in turn influence more consequential downstream judgments about, for example, firm value.

I propose that the effect of estimate-related disclosures on investors' judgments is moderated by the mindset with which investors analyze financial statement information. Investors likely approach their investment analyses with a particular mindset (i.e., a disposition to interpret information in a concrete or abstract way).<sup>2</sup> While there are individual differences in investors' natural disposition to process information more concretely or abstractly (Vallacher and Wegner 1989), investor mindset also likely varies *systematically* with contextual determinants in the investment environment. According to construal level theory (CLT), people process information from varying levels of psychological distance, and distance arises along a number of dimensions, including time, space, social similarity and hypotheticality (e.g., Trope and Liberman 2000, 2010; Trope et al. 2007). Variation in psychological distance in turn affects mindset. Specifically, lower distance creates a disposition to focus on concrete information and higher distance creates a disposition to focus on abstract information.

In this study, I consider a setting in which mindset varies because of the temporal orientation of investors considering different investment horizons: short horizon investors adopt a concrete mindset and long horizon investors adopt an abstract mindset. Investment horizon is among the

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<sup>2</sup> This definition is derived from the psychology literature on mindsets. For example, Freitas et al. (2004) define mindsets as the differing accessibility of cognitive operations. These operations create a general disposition to process and understand information in a particular manner. Thus, an individual with a concrete mindset will focus on a situation's low-level, contextualized features, while an individual with an abstract mindset will focus on the high-level, decontextualized features of a situation.

first and most important issues that individual investors and financial advisers consider when identifying investment objectives (CFA Institute 2010). Furthermore, although investment horizon has received some attention in the finance and accounting literature, the finance literature has focused largely on optimal portfolio allocation for investors with differing horizons (e.g., Samuelson 1994, Bierman 1998, Barberis 2000), while the accounting literature has considered the different trading strategies of transient versus dedicated institutional investors (e.g., Bushee 2001; Ke and Petroni 2004; Elliott, Krische and Peecher 2010). However, we know little about how this important feature of the investment context systematically influences the way in which investors interpret and use accounting information.

I expect the effect of estimate-related disclosures on investors' precision and valuation judgments to depend jointly on the measurement information contained in the disclosure and investor mindset. CLT suggests that an abstract mindset associated with a long investment horizon will cause investors to focus on the central feature of the information set related to an estimate, the value or change in value represented by the recognized point estimate. A short horizon investor with a relatively concrete mindset, however, will also consider peripheral information, such as disclosed information about the assumptions and measurement techniques used to derive the recognized point estimate. Thus, disclosures that reveal a high degree of uncertainty in the measurement process (for example, disclosing that a fair value was estimated via a model that incorporated significant unobservable inputs) will have a greater effect on the precision judgments of short horizon (versus long horizon) investors because of the relatively concrete mindset with which they process the available information.

Investor mindset also has implications for the effect of financial statement estimates and related disclosures on investors' judgments of firm value. An abstract representation of a



financial statement item will emphasize the economic implication of the item, or *why* the item was included in the firm's financial statements. By contrast, a concrete representation will emphasize the measurement characteristics of the item, or *how* the item was included in the financial statements. For example, I consider a setting in which the recognized value of an impaired asset is measured relatively precisely or imprecisely. Thus, the impairment can be represented abstractly as a decrease in value or concretely as a precise or imprecise measure. When considering the effect of the impairment on firm value, CLT predicts that long horizon investors' abstract mindsets will cause them to focus primarily on the decrease in value. Consequently, I expect an asset impairment to reduce the value that long horizon investors place on the firm, with little effect of disclosed differences in measurement. By contrast, short horizon investors will place more weight on the concrete representation of the value as a precise or imprecise measure. Further, whereas standard economic theory would predict that a more precisely measured impairment would have a more strongly negative effect on judgments of firm value, short horizon investors' concrete mindsets mean that they more likely interpret the measurement information as a positive or negative signal in its own right. Thus, compared to long horizon investors, I expect short horizon investors to *discount* the negative effect of the impairment on firm value when precision is high, but *amplify* the negative effect when disclosures reveal a low level of precision in the asset's measurement.

To test my predictions, I conduct an experiment that uses a 2 x 2 + control design, with investment horizon and fair value disclosures as between-subjects manipulated independent variables. Graduate students in accountancy take on the role of investors evaluating either a short-term or a long-term investment in a firm's common stock. All participants are provided with information from the firm's financial statements about an impairment charge to land that the

firm is holding for development. In addition, participants are provided with disclosures indicating that the fair value of the land was estimated using significant other observable (level 2) inputs or significant unobservable (level 3) inputs (or no disclosures in control conditions). All participants then judge the precision of the recognized value of the land and indicate how the impairment affects the value they place on the firm.

Results of the experiment support my predictions. First, I find that, compared to investors who observe level 2 disclosures, investors who observe level 3 disclosures judge a recognized fair value estimate to be less precise; however, the reduction in judged precision is amplified by a short investment horizon. Second, investment horizon affects the weight that investors place on disclosed precision information when they judge the effect of the impairment on firm value. Specifically, long horizon investors' valuation judgments reflect the negative effect of the impairment with no significant influence of disclosures. By contrast, the impairment does not significantly impact short horizon investors' valuation judgments when disclosures reveal level 2 inputs, but has a significantly negative effect when disclosures reveal level 3 inputs. Furthermore, the effect of fair value disclosures on the valuation judgments of short horizon investors is fully explained by their judgments of estimate precision. By contrast, judged precision does not significantly influence the valuation judgments of long horizon investors.

It is important to note that this pattern of results is inconsistent with standard models of firm value; nor can it be fully explained by situational differences in short and long horizon investors' risk tolerance. Furthermore, I provide corroborating evidence of the process underlying my results. Specifically, short horizon investors provide more concrete written descriptions of the firm than long horizon investors, consistent with investment horizon moderating investors' judgments via differences in mindset. In addition, I confirm that the results of my hypothesis

tests are unlikely to be explained by differences in participants' information acquisition, perceptions of bias, or their own subjective expertise. In an additional analysis, I find that investors in control conditions attribute a relatively high level of precision to the recognized estimate in the absence of disclosures, suggesting that concerns about an illusion of precision in financial statement estimates are likely justified.

In a supplemental experiment, I use an alternative manipulation of temporal orientation to instantiate mindset and test the *incremental* effect of additional disclosures required for level 3 fair value inputs. This allows me to disentangle the effect of the additional disclosures required for level 3 inputs from changes in input level (i.e., moving from level 2 to level 3 inputs). Furthermore, whereas the materials in my primary experiment provide primarily *qualitative* disclosures, this supplemental experiment tests the incremental effect of disclosing more detailed *quantitative* information of the type anticipated by a recent update to US and international accounting standards (FASB 2011b). Results reveal that disclosing detailed quantitative information about the inputs and processes used to estimate a fair value reduces the precision judgments of investors with a concrete mindset associated with a short-term orientation, but does not significantly affect the precision judgments of investors with an abstract mindset associated with a long-term orientation.

This study contributes to the academic accounting literature and to practice. First, I present theory and evidence that investment horizon systematically affects the mindset with which investors process financial statement information. Although horizon is only one of several likely determinants of investor mindset, I examine horizon because it is a key contextual variable that may have unexpected consequences for investors' judgments and decisions. Second, my study extends our understanding of the way in which investors use measurement information in their

valuation judgments (see, e.g., Maines and Wahlen 2006), including circumstances in which measurement information is accorded too much emphasis (e.g., Kadous, Koonce and Thayer 2011). Third, I provide evidence that the effect of estimate-related disclosures on investors' judgments depends jointly on the content of the disclosures and investment horizon. This finding is likely useful to financial advisors and investor groups in anticipating the way in which features of the individual investment decision interact with the information environment. My study also responds to regulators' general concern with the protection of first-time and non-professional investors (e.g., SEC 2011), and specific concerns about the way in which an appearance of precision in financial statement estimates may impair investors' ability to understand firms' operating performance and financial position (e.g., SEC 2002). Specifically, my findings are likely to be of interest to standard setters and regulators in making judgments about the effectiveness of existing and proposed disclosures in communicating information about estimate precision.

The remainder of this paper is organized as follows. Chapter 2 reviews the relevant literature and provides appropriate background for the study. I develop hypotheses in Chapter 3 and discuss experimental design in Chapter 4. Chapter 5 presents results of my hypothesis tests, while Chapter 6 presents several additional analyses. Chapter 7 discusses the supplemental experiment, and I summarize and conclude in Chapter 8. Figures and tables can be found in Chapter 9.

## CHAPTER 2

### BACKGROUND AND LITERATURE REVIEW

#### 2.1 PRECISION AS A CHARACTERISTIC OF ACCOUNTING INFORMATION

Although discussed in both SFAC 2 (FASB 1980) and SFAC 8 (FASB 2010), precision is not explicitly defined in the concept statements or elsewhere in authoritative standards. The *Oxford Dictionary of Statistical Terms* defines precision as “the property...of an estimate having small random error of estimation” (Dodge 2006). While this definition conforms closely to the way in which the term is used in the conceptual framework and in accounting research (e.g., Dye and Sridhar 2007), the concept statements in particular employ a somewhat broader conception of precision. For example, SFAC 2 contains a discussion of “precision and uncertainty”, which implicitly defines precision as reflecting the degree of uncertainty about an estimate’s true value (FASB 1980, para. 73). In this study, I define an accounting estimate as more precise the smaller the degree of random error in its measurement and, by extension, uncertainty about its true value.

The FASB has taken pains to distinguish precision from other qualitative characteristics of accounting information, especially reliability and faithful representation. SFAC 2 states that “[r]eliability does not imply certainty or precision. Indeed, any pretension to those qualities if they do not exist is a negation of reliability” (FASB 1980, para. 72). Despite this warning, however, many users seemingly do confuse reliability with precision (Schipper 2007, Journey 2010). Indeed, SFAC 8 cites the confusion of precision with reliability as a key reason for replacing the term reliability with faithful representation.

How does precision differ from faithful representation (and formerly, reliability) as defined by the FASB? According to the conceptual framework, the notion of faithful representation encompasses all information related to the phenomenon being measured and reported in the

financial statements, including not only the recognized point estimate, but also descriptions of the *process* used to arrive at the point estimate. As stated in SFAC 8, an “estimate can be a faithful representation if the reporting entity has applied properly an appropriate *process*, described properly the estimate, and explained any uncertainties that significantly affect the estimate” (FASB 2010, para QC16). By contrast, precision refers to the level of measurement error associated with the recognized point estimate, and by extension, the uncertainty associated with the true value of the phenomenon. Thus, an estimate can be *both* faithfully represented *and* imprecise as long as the uncertainties that contribute to the imprecision and the process used to arrive at the estimate are adequately explained. It is also worth noting that the FASB’s notion of faithful representation also differs somewhat from construct validity,<sup>3</sup> in that a phenomenon can be faithfully represented so long as the imprecision in the estimate (or “slippage” from the construct to its measurement) is documented in a related disclosure.<sup>4</sup>

SFAC 8 also suggests that precision is more closely related to *relevance* than faithful representation, stating “if the level of uncertainty in...an estimate is sufficiently large, that estimate will not be particularly useful. In other words, the *relevance* of the asset being faithfully represented is questionable” (FASB 2010, para. QC16). This notion of a normative relation between precision and relevance comes from statistical decision theory and Bayesian inference (see, e.g., Berger 1985). A rational Bayesian decision maker revises his or her existing

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<sup>3</sup> In a research context, construct validity is “the degree to which inferences are warranted from the observed persons, settings, and cause and effect operations included in a study to the constructs that these instances might represent” (Shadish, Cook and Campbell 2002). In a financial statement setting, construct validity might be defined as the degree to which inferences are warranted about the attributes of interest (e.g., fair value, historical cost) on the basis of values reported in the financial statements.

<sup>4</sup> Relatedly, precision is not the same as accuracy. Precision is the level of random error in measurement; accuracy is the difference between an estimated value of a particular quantity and its true value. Accuracy does not capture the construct of interest in this study. As discussed in SFAC 8 (para QC15, FASB 2010), “an estimate of an unobservable price or value cannot be determined to be accurate or inaccurate.” By contrast, the relative level of error in an estimate *can* be determined with sufficient information about the assumptions and process that management uses in deriving the estimate. Thus, precision is informative about the level of uncertainty associated with the true value of a financial statement item. Providing information about this level of uncertainty – and in some cases, quantifying it – is a primary purpose of estimate-related disclosures, which are the focus of this study.

belief (or “prior”) about a phenomenon when new information about the phenomenon becomes available (the revised belief is called a “posterior”). The greater the precision of the new information, the more weight it receives in forming the posterior. For example, in a financial statement context, users are typically interested in the level and timing of a firm’s future cash flows. When new information becomes available that indicates a change in the level or timing of future cash flows, the absolute value of the adjustment a rational Bayesian financial statement user will make to his or her beliefs about future cash flows will be positively correlated with the precision of the new information.

## 2.2 THE ILLUSION OF PRECISION IN FINANCIAL STATEMENT ESTIMATES

Regardless of the extent to which precision is related, either descriptively or normatively, to other qualitative characteristics, the *appearance* of precision in financial statements is a long-standing concern among standard setters, regulators and academics. In the early 20<sup>th</sup> century, the American Institute of Accountants expressed concern that users view the balance sheet as “an instantaneous photograph” (AIA 1932). As current standards and practice have moved toward recognizing more estimates, regulators have renewed these concerns. In FR No. 60, for example, the SEC claims that “reported financial position and results often imply a degree of precision, continuity and certainty that can be belied by rapid changes in the...environment that produced those measures” (SEC 2002). Former SEC commissioner Cynthia Glassman echoes this unease, worrying that “the various columns and rows and numbers that appear so definitive...are based in large part on estimates, assumptions and sampling” (Glassman 2006). Most recently, Peecher et al. (2010, p. 4) conclude that “there is a resilient myth afloat – that financial statements reflect historic *facts*.” Moreover, they point out that this myth is perpetuated by sources that range in authoritativeness from bloggers to judges and even accounting professors.

Accounting research has also raised concerns and provided empirical evidence regarding the precision of accounting estimates (or lack thereof). This work spans four related themes: (1) the precision of accounting estimates compared to accounting “facts”, (2) users’ ability to quantify the degree of (im)precision in estimates, (3) managers’ choice of, and investors’ demand for, precision in voluntary disclosures.

First, scholars from Paton and Littleton (1940) to Nissim and Penman (2008) have argued for retaining depreciated historical cost on the face of financial statements in part because historical costs (and their subsequent depreciation) are by their nature precise, whereas current or replacement costs tend to be estimates.<sup>5</sup> Recognizing this fundamental difference between “facts” and “forecasts” (their term for estimates), Glover et al (2005) propose a new structure for financial statements, in which recognized estimates occupy a separate column. This approach accepts that, while estimates are, by definition, less precise than non-estimates, a certain degree of error is tolerable if estimates communicate sufficient incremental information over non-estimates about future performance. So how informative are estimates? Lev, Li and Sougiannis (2010) suggest that they may be less informative than is often assumed. In a series of out-of-sample tests, Lev et al. find that, with the exception of changes in working capital accruals, including estimates in prediction models contributes very little incremental predictive power over current period cash flows. They conclude, “estimates, in groups or by individual components, do not contribute appreciably to the prediction of cash flows” (p. 805). Furthermore, they find that although estimates do provide incremental predictive power for future net income, this difference is not economically significant. The failure of estimates to

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<sup>5</sup> Paton and Littleton (1940) and others (e.g., Ijire and Jaedicke 1966) refer to the “objectivity” of accounting information. While the current use of this term might imply neutrality, these scholars use the term to mean degree of measurement error, reserving the term “bias” for a lack of neutrality.



contribute incremental predictive power over current period cash flows is consistent with a relatively a low level of precision in accounting estimates.

Second, Lundholm (1999) bemoans the impossibility of separating bias in accounting estimates from random error (i.e., precision) and recommends an *ex-post* reconciliation of estimates from previous periods. Lev (2003) goes further, proposing a mandatory revision of historical earnings one and three years hence, the revised earnings incorporating the realizations of estimates underlying the previously reported earnings. While subsequent research (Hirst, Jackson and Koonce 2003; Koonce, Williamson and Winchel 2010) has raised doubts about the effectiveness of such proposals, they nevertheless highlight the demand for information that would enable financial statement users to quantify the level of precision in accounting estimates.

Third, the apparent precision of financial statement estimates results from the requirement that firms recognize point estimates (rather than, for example, range estimates) on the face of financial statements. Prior research suggests that, in the absence of this requirement, firms would likely not choose to disclose point estimates for items whose value is uncertain, as evidenced by the multiple guidance forms used by firms issuing earnings forecasts (e.g., Libby, Tan and Hunton 2006; Han and Tan 2007). Indeed, a recent survey of corporate managers by the National Investor Relations Institute finds that only 9% of respondents issue point estimate earnings forecasts (NIRI 2007). Although managers may issue range forecasts partly in order to limit liability, they also serve to signal managers' uncertainty and increase credibility (King, Pownall and Waymire 1990; Francis, Philbrick and Schipper 1994; Hirst, Koonce and Venkataraman 2008). Previous research also indicates that *users* would prefer not to receive apparently precise point estimates in the face of high uncertainty. Rather, users seek congruity between the expected level of uncertainty in an estimate and the precision with which the

estimate is communicated (e.g., Budescu and Wallsten 1995; Du, Budescu, Shelly and Omer 2011). Despite this evidence, rather than move toward an alternative model of financial reporting that recognizes the shared preference of preparers and users for estimates that reflect environmental uncertainty (e.g., Glover et al. 2005), standard setters have instead chosen to mandate disclosures that provide additional information about the level of uncertainty in recognized point estimates.

In summary, these studies indicate that concerns about the illusion of precision in recognized accounting estimates are long-standing and widespread. This study makes two unique contributions to this literature. First, I investigate the effectiveness of mandated disclosures in communicating differences in estimate precision, and identify investor mindset as a moderator of investors' evaluation and weighting of disclosed precision information. Moreover, I examine how mindset varies with investment horizon, a key contextual feature of the financial decision making environment. Second, in additional analyses, by directly comparing financial statement users' precision judgments in the presence and absence of disclosure and actively manipulating the level of disclosed precision, I am able to determine whether the default level of precision ascribed to estimates is relatively high or low compared to an objective benchmark.

## 2.3 RECOGNIZED ESTIMATES AND ESTIMATE-RELATED DISCLOSURES

### *2.3.1 Definitions*

In distinguishing between recognition and disclosure, I adopt Schipper's (2007) definitions. She defines recognition as "depictions in numbers with captions on the face of the financial statements," and required disclosures as "display in the notes and supporting schedules that accompany financial statements" (p. 301). While recognized items are predominantly quantitative, disclosures contain a mix of quantitative and qualitative information. An example

of a qualitative disclosure is a description of the process used in arriving at a recognized point estimate – i.e., “the fair value was generated using a discounted cash flow analysis”. An example of a quantitative disclosure is the specific cash flows and discount rate used in the analysis.

The key distinction between estimates and non-estimates, or “facts”, is the level of certainty in the transactions underlying their measurement (Glover et al 2005). Estimates reflect either expected future transactions (i.e., transactions that have not yet occurred), or incomplete historical transactions (i.e., transactions that give rise to some future obligation or benefit). An example of the former is the expected future cash flows in a net present value calculation in a test for asset impairment (e.g., FASB 2000). An example of the latter is the warranty reserve associated with revenue recognition. In both cases, estimates reflect managers’ expectations and assumptions about the future.

Thus recognized estimates are numbers on the face of financial statements derived from a process that uses managers’ assumptions and expectations as inputs. Estimate-related disclosures are qualitative or quantitative descriptions of the inputs and process used to arrive at the recognized point estimate.

### *2.3.2 The purpose of required disclosures*

Schipper (2007) defines three possible paths to defining the purpose of required disclosures: (1) theory-based insights from analytical models, (2) authoritative guidance from standard setters, and (3) analysis of existing and proposed disclosures. Regarding (1), Schipper and others (e.g., Verrecchia 2001, Dye 2001, Beyer et al 2010) note the lack of an accepted theory of mandatory disclosure, resulting primarily from the difficulty of specifying the objective (and thus the objective function) of required disclosures. Is the objective to minimize information

asymmetry? Maximize social welfare? Minimize costs or negative externalities? It is likely some combination of these and more, and this complexity makes the optimization problem intractable.

With respect to specific guidance, Schipper (2007) concludes that the purpose identified in the FASB's conceptual framework – that disclosures should provide useful information to users in their capacity as capital providers – is too general to be useful, and furthermore does not distinguish between recognition and disclosure.<sup>6</sup> Furthermore, Johnson (1992), Barth and Murphy (1994), and Schipper (2007) all consider more specific guidance about the purpose of disclosures in accounting standards (rather than in the concept statements).<sup>7</sup> While the guidance in individual standards tends to be more specific, it is incomplete. That is, standards do not always specify the purpose of the disclosures they require, and the apparent purpose of some disclosures is absent from standards altogether. As a result, Schipper (2007, p. 309) concludes, “research whose objective is to provide evidence on whether disclosures have the intended effects (or unintended effects, or no effects at all) tends to proceed along lines that are similar to the pragmatic and *ad hoc* standard-setting approach to establishing disclosure requirements.”

### 2.3.3 Fair value disclosures

There are several examples of required disclosures whose purpose is, at least in part, to provide information about estimate precision. These include the market risk disclosures required by FR 48 (SEC 1997), and the sensitivity analyses for other post-employment benefits required by FASB ASC 715 and for securitized financial assets in FASB ASC 860. However, in this study, I focus specifically on the disclosures associated with inputs to fair value measurements

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<sup>6</sup> The FASB is currently engaged in a disclosure framework project that may clarify the purpose(s) of required disclosures, including differences in objectives related to recognized versus disclosed information. However, as of this writing, the board has not established a timetable or deadline for completion of this project.

<sup>7</sup> For example, SFAS 105 (FASB 1990, Johnson 1992) identifies four key purposes of required disclosures: (1) describe recognized items and provide measures other than the recognized measure, (2) describe and measure unrecognized items, (3) provide information to help users assess the risk of recognized and unrecognized items, and (4) provide information on an interim basis while accounting issues are being considered.

required by FASB ASC 820. FASB ASC 820 defines fair value disclosure requirements. Specifically, paragraph 820-10-50-1 defines disclosures that are required for assets and liabilities that are measured at fair value on a recurring basis subsequent to initial recognition (e.g., financial securities), while paragraph 820-10-50-5 sets out disclosure requirements for items that are measured at fair value on a nonrecurring basis (e.g., impaired assets). Additional disclosures for fair values derived using significant unobservable inputs (designated “level 3” in the fair value hierarchy) appear in paragraph 820-10-50-2, which requires disclosure of the inputs and valuation technique(s) used to measure fair value.

I focus on these disclosures for two main reasons. First, and most importantly, their purpose is clear: they are intended to facilitate assessments of uncertainty in estimates of fair value (FASB 2011b). In particular, the additional disclosures required for unobservable (level 3) inputs compared to quoted prices in active markets (level 1) and other observable inputs (level 2) highlight the inherent uncertainty in unobservable inputs (FASB 2011b, para. BC84). Second, because the requirements of FASB ASC 820 apply generally to fair value measurements, their influence will be broader than the disclosures required by other standards, which are related to specific estimates. Insights related to these disclosures thus more likely generalize to any setting in which estimates of fair value are recognized.

## CHAPTER 3

### THEORY AND HYPOTHESIS DEVELOPMENT

#### 3.1 CONSTRUAL LEVEL, PSYCHOLOGICAL DISTANCE AND MINDSET

Any phenomenon can be represented at varying levels of abstraction (Vallacher and Wegner 1987, Freitas et al. 2004). Thus a trip to Japan can be interpreted as either “an exciting getaway” or “a long plane ride”; soccer might be “the beautiful game” or “kicking a ball”; and driving a car is “commuting to work” or “pressing the accelerator and turning the wheel”. While both descriptions in each pair are accurate, each constitutes a fundamentally different representation of the underlying phenomenon, the former more abstract and the latter more concrete. In general, abstract representations reflect the “why” of a phenomenon, while concrete representations reflect the “how” (Alter and Oppenheimer 2008).

The way in which people represent a phenomenon depends on the level of psychological distance between the person and the phenomenon (Trope et al. 2007, Trope and Liberman 2010).<sup>8</sup> The greater the psychological distance between the phenomenon and the self, the more likely that people will represent it abstractly, focusing on central, high-level features that “extract the gist” from available information. When psychological distance is low, however, people also include low-level, peripheral features in their representations (Kim, Park and Wyer 2009).

Construal level theory (CLT) asserts that psychological distance arises along a number of dimensions, including time, space, social similarity, and hypotheticality (e.g., Trope and Liberman 2010). While recognizing the uniqueness of the various distance dimensions, CLT posits that these dimensions have similar effects on mindset. Specifically, low (high) psychological distance on any of these dimensions is associated with a relatively concrete

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<sup>8</sup> Psychological distance is “a subjective experience that something is close or far away from the self” (Trope and Liberman 2010, p. 440).

(abstract) mindset. As such, there are several likely determinants of mindset in the financial reporting environment. Before discussing investment horizon, a temporal distinction which is the focus of this study, the following section briefly outlines features of the financial reporting environment that are likely to give rise to psychological distance and, thus, investor mindset along other dimensions.

### *3.1.1 Determinants of psychological distance and mindset in the financial reporting environment*

First, current versus prospective *investor status* (i.e., whether or not an investor holds shares in a firm), is likely to give rise to psychological distance on the basis of *hypotheticality*, with current investors psychologically closer to the firm than prospective investors because of the real – versus imagined – link between the wealth of current investors and that of the firm. Previous research provides evidence consistent with this hypothesis. For example, Hodge and Pronk (2006) find that current investors in a Dutch firm access financial statement information more frequently than prospective investors, while the reverse is true for management discussion and analysis (MD&A). To the extent that the information in MD&A is more abstract than the tables and schedules in financial statements, this finding is consistent with current and prospective investors accessing information that corresponds to their mindset. In addition, Elliott and White (2011) find that current investors judge an earnings metric that includes transitory changes in fair value to be more relevant to their investment decisions than prospective investors, while prospective investors assess an earnings metric that includes only relatively permanent elements to be more relevant than a metric that includes both permanent and transitory elements. This is consistent with the CLT prediction that people focus more on central (peripheral) features of information from a high (low) level of psychological distance.

Second, *geographic distance* between an investor and a firm is likely to give rise to psychological distance along the *spatial* dimension. Geographic distance has been shown to play a role in investment behavior. For example, portfolio theory suggests that investors should diversify their investments far more broadly than they actually do, and part of this lack of diversification can be attributed to a “home bias” – the tendency to invest in firms that are geographically close to the investor’s home. The home bias literature has demonstrated a bias for firms located in investors’ home country compared to international stocks (e.g., French and Poterba 1991) and for locally headquartered US firms over firms in different regions of the US (e.g., Coval and Moskowitz 1999). Recognizing the likely role of psychological distance in the home bias phenomenon suggests potential mechanisms for reducing it. For example, leveraging the bidirectional relation between psychological distance and construal level, Elliott, Rennekamp and White (2012) find that highlighting a relatively concrete representation of a foreign firm to prospective investors increases their willingness to invest in the firm’s stock.

Third, investors’ *familiarity* with a firm and/or its products and services is likely to give rise to psychological distance on the basis of *social similarity* (for evidence on the relation between psychological distance and familiarity, see Stephan, Liberman and Trope 2011). As with geographic distance, research has shown that familiarity plays a role in investment choice. For example, compared to the recommendations of portfolio theory, investors tend to over-invest in the equity of firms of which they are employees or customers (e.g., Huberman 2001). Furthermore, Grinblatt and Keloharju (2001) suggest that investors’ preference for firms that are geographically close and those that share the investors’ native language or culture is actually a function of the same underlying preference for familiarity. As with home bias, understanding the role of psychological distance in determining investors’ acquisition and processing of



information about more or less familiar firms may be helpful in mitigating a source of systematic bias in investment behavior.

### *3.1.2 Investment horizon and mindset*

In this study, I consider how temporal differences in investment horizon influence mindset. I focus on investment horizon for both practical and theoretical reasons. First, investment horizon is among the most important issues considered by investors and their advisors when they make investment decisions and recommendations (CFA Institute 2010). Investment horizon has received some attention in the finance and accounting literature. The finance literature has focused largely on optimal portfolio allocation (e.g., Samuelson 1994, Bierman 1998, Barberis 2000), while the accounting literature has considered the trading strategies of institutional investors with differing horizons (e.g., Bushee 2001; Ke and Petroni 2004; Elliott, Krische and Peecher 2010). Despite these streams of literature, we know little about how this important feature of the investment context influences the way in which individual investors process financial information. It is important to understand these individual-level effects because (1) they provide individual investors with insights into their own judgment and decision processes, equipping them to make higher quality decisions, and (2) systematic individual biases have the potential to affect market behavior (Libby, Bloomfield and Nelson 2002). Second, from a theoretical perspective, temporal distance was the first dimension along which psychological distance was hypothesized to arise (Trope and Liberman 2000), and has since been consistently supported by evidence as a determinant of psychological distance and construal level. Thus temporal differences in perspective have considerable theoretical and empirical support as determinants of psychological distance.

Investment horizon affects investors' temporal orientation. Short horizon investors are oriented toward the present and the near future, while long horizon investors are oriented toward the more distant future. As a result, the mindset with which investors approach their investment analyses likely varies with their investment horizon. Specifically, I expect long (short) horizon investors to process financial statement information with a relatively abstract (concrete) mindset.

### 3.2 HYPOTHESIS 1: EVALUATING ESTIMATE PRECISION

Mindset has important consequences for the effect of fair value disclosures in shaping investors' evaluation of estimate precision. Financial reporting standards and accounting convention dictate that the information set available to investors evaluating the precision of a fair value estimate includes (1) the recognized value or change in value, which is the central or focal feature of the information set, and (2) disclosed information about the assumptions and measurement technique underlying the point estimate, which is relatively peripheral. CLT suggests that long-horizon investors' abstract mindsets will lead them to focus on the recognized information. By contrast, the relatively concrete mindset associated with a short investment horizon will emphasize disclosed measurement information. Short horizon investors' focus on measurement is likely to increase the salience of uncertainty associated with unobservable inputs and the diversity of alternative outcomes that could arise if managers made other assumptions. Therefore, although I expect level 3 disclosures to reduce investors' perceptions of estimate precision compared to level 2 disclosures, I expect this effect to be greater for short-horizon investors because of the concrete mindset with which they process financial statement estimates and related disclosures.

This leads to the following hypothesis (depicted graphically in Panel A of Figure 1):

**H1:** Compared to level 2 fair value disclosures, level 3 disclosures will result in a greater reduction in judgments of estimate precision for short horizon investors than for long horizon investors.

### 3.3 HYPOTHESIS 2: WEIGHTING OF ESTIMATE PRECISION IN VALUATION

Differences in mindset also have implications for the effect of financial statement estimates and related disclosures on investors' valuation judgments. In considering the effect of an estimate on firm value, an investor with an abstract mindset will focus on the high-level economic implication of the estimate. By contrast, an investor with a relatively concrete mindset will focus on the low-level feature of the estimate's measurement. For example, I consider a context in which investors evaluate the effect of an impaired asset on firm value. When the asset's impaired value is measured with a low degree of error, it might be represented abstractly as "a decrease in value" or concretely as "a precise measurement". The representations may be consistent (i.e., both positive or both negative) or inconsistent (i.e., one is negative and one is positive, as when an impaired asset is measured with a low degree of error).

The relative weight that investors place on these representations likely depends on differences in mindset arising from investment horizon. Because of their abstract mindsets, long horizon investors will base their valuation judgments primarily on the economic implication of a recognized estimate, with little regard for differences in measurement. By contrast, short horizon investors' concrete mindsets will lead them to weight measurement information more heavily than long horizon investors. Furthermore, although standard economic and statistical decision theory, as reflected in SFAC 8, suggests that investors ought to place greater weight on the economic implication of a more precisely measured estimate in their valuation judgments (since there is more certainty about the estimate's value), short horizon investors are unlikely to

interpret disclosed measurement information in this way. Rather, they likely interpret high (low) estimate precision as a positive (negative) signal in its own right because their concrete mindsets emphasize the concrete representation of the estimate over more central economic implications. Moreover, when economic and measurement signals conflict, the influence of the economic signal will be diminished by short horizon investors' focus on the measurement signal.<sup>9</sup>

Consequently, I expect an asset impairment to reduce the value that long horizon investors place on a firm, with little effect of disclosed differences in measurement. By contrast, short horizon investors likely underweight the negative effect of an impairment when estimate precision is relatively high (i.e., the measurement signal is positive), but strongly reduce their valuation judgments in response to the negative signal of imprecise measurement.<sup>10</sup> That is, I expect the effect of the impairment on short horizon investors' valuation judgments to be driven primarily by their precision judgments.

This leads to the following hypotheses (see Panel A of Figure 2):

**H2a:** The negative effect of an asset impairment on judgments of firm value will be smaller (larger) for short horizon investors than for long horizon investors when disclosures reveal level 2 (level 3) inputs.

**H2b:** The effect of fair value disclosures on short horizon investors' judgments of firm value will be mediated by their judgments of estimate precision.

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<sup>9</sup> To the extent that short horizon investors *do* increase the weight they place on an estimate's economic implication when it is measured more precisely, this biases *against* finding a result consistent with my prediction.

<sup>10</sup> This pattern is inconsistent with standard models of firm value, which depend on expected future cash flows and firm-level cost of capital, neither of which vary with the period over which an individual investor expects to hold his or her investment in the firm. Further, to the extent that considering a short or long investment horizon instantiates situational differences in investors' risk tolerance, and these differences influence valuation judgments, such an influence would suggest a main effect of horizon. See Section 8.2 for further discussion of the normative implications of my theory and results.

## **CHAPTER 4**

### **EXPERIMENTAL METHOD**

#### **4.1 DESIGN OVERVIEW AND PARTICIPANTS**

To test my predictions, I conducted an experiment with a full-factorial 2 x 2 + control between subjects design, with investment horizon (short vs. long) and fair value disclosures (level 2 vs. level 3) as manipulated independent factors. I manipulated horizon by asking participants to assume that they were considering either a short-term investment or a long-term investment in the common stock of a hypothetical real estate firm. I manipulated disclosures related to the fair value of land held for development that had suffered an impairment loss during the year by providing disclosures consistent with a fair value estimated using level 2 or level 3 inputs (or no disclosures in control conditions).

Participants were 140 masters of accounting students from a large state university. They participated in return for a guaranteed payment of \$10 and a chance to win one of five \$100 Amazon.com gift cards in a random draw. I selected this participant group because of their familiarity with the recognition and disclosure of accounting estimates, relevant fair value measurement techniques, and the fair value hierarchy defined in FASB ASC 820. Furthermore, at the time of the experiment twenty-eight percent (39 of 140) had previously invested in a firm's debt or equity securities and eighty-six percent (121 of 140) planned to do so in the next five years.

#### **4.2 CASE MATERIALS AND PROCEDURES**

On arrival at the session, each participant was randomly assigned to an experimental condition and given a packet of materials. After reading and signing a consent form, participants

assumed the role of investors evaluating a potential investment in “ArgyleBay Communities”, a hypothetical real estate firm.

#### *4.2.1 Investment Horizon Manipulation*

Participants in short horizon conditions were asked to assume that they were considering a short-term investment in the residential real estate industry and that they had identified ArgyleBay’s stock as a potential investment. Furthermore, they expected to hold their investment for no more than three months. Participants in long horizon conditions were given identical instructions, except that they were considering a long-term investment that they expected to hold no less than five years.

I asked participants to take on the role of prospective (rather than current) investors for three reasons. First, this choice allowed me to instantiate differences in temporal orientation associated with expected investment horizon without imposing a hard deadline for liquidating an investment; that is, my horizon manipulation does not alter the actual nature or extent of participants’ economic relation with the firm, only their expectations. Second, current and prospective investor status has the potential to influence mindset via the hypotheticality dimension of psychological distance, since a prospective investment can be considered more hypothetical than a current investment. Thus asking participants to take on the role of prospective investors likely means examining a setting in which hypotheticality is relatively high. Because I expect my manipulations to have a greater influence on investors with a concrete mindset, holding hypotheticality constant at a relatively high level biases *against* finding support for my hypotheses. Third, current investors likely have stronger directional preferences (e.g., for information that suggests the value of their investment has increased) than prospective investors (e.g., Elliott and White 2011). The psychology literature has not examined the interactive effects

of directional preferences and mindset, and I have no *ex-ante* expectation about the effect of introducing directional preferences into my experimental setting. However, because directional preferences and mindset are among the more powerful determinants of individual judgment and decision making, holding participants' directional preferences constant at low level allows for a relatively clean test of the mindset's influence.

Next, short (long) horizon participants were asked to list three factors that would be important in predicting the performance of a short-term (long-term) investment in ArgyleBay stock and to list three ways in which they would use the money from their investment when they cashed it in (see Appendix A). Considering the expected holding period and the intended use of the proceeds from the investment mirrors the way in which horizon is incorporated into the decisions of individual investors; in addition, listing these factors ensured that participants actively considered the horizon over which they expected to hold their investment.<sup>11</sup>

#### *4.2.2 Background Information and Disclosure Manipulation*

All participants then received background information about the firm, including its real estate holdings, its strategy and its reportable segments. After reviewing this material, participants provided written descriptions of the firm to provide corroborating evidence that the horizon manipulation caused differences in mindset (see “Manipulation Checks” in Section 5.1).

Next, participants reviewed selected information from the firm's financial statements, including major income statement and balance sheet items, and ratios for each of the past three years. In addition, they viewed two line items from the firm's most recent financial statements related to an impairment loss on land held for development. The first line item came from the

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<sup>11</sup> This manipulation differs from the way in which mindset is typically manipulated in the psychology literature, in that my manipulation is closely related to the focal task of evaluating financial statement information, whereas mindset is often manipulated via a clearly unrelated task (see, e.g., Freitas et al. 2004, for an example). In the supplemental experiment reported in Chapter 7, I use a manipulation that is more clearly unrelated to the focal task.

income statement and listed an impairment loss of \$21,152 (all dollar amounts in thousands) on land held for development. The second line item came from the balance sheet, and listed land held for development at a carrying value of \$267,095, with a caption stating that this amount represented the fair value of the land net of the impairment charge.

In addition to these line items, participants in level 2 and level 3 disclosure conditions viewed a note related to the impairment charge. In both disclosure conditions, the note disclosed the reason for the impairment and the designation of the fair value as either a level 2 or level 3 price within the fair value hierarchy. In accordance with FASB's fair value disclosure requirements, the level 3 disclosure also contained a description of the expected present value technique and associated inputs used to generate the fair value. Disclosures were modeled on actual disclosures and examples provided in accounting standards. Appendix B contains details of the disclosure manipulation.

After reviewing financial information, participants responded to dependent measures, manipulation checks and other post-task questions.

### 4.3 DEPENDENT MEASURES

#### *4.3.1 Hypothesis 1: Precision*

To test H1, I collected two measures of judged precision. First, I asked participants "How sure are you that \$267,095 is the actual fair value of ArgyleBay's land held for development at the end of Year 3?" Participants responded on 101-point Likert scales with endpoints 0 ("Not at all sure") and 100 ("Very sure"). Recall that I define precision as the level of random error in measurement and, by extension, uncertainty about an estimate's true value; thus judged precision should be positively associated with participants' certainty that the recognized value is the actual



fair value of the land at the balance sheet date.<sup>12</sup> Second, I provided participants with a definition of precision (“Precision is the level of error in measurement; the lower the error, the more precise the measure”) and asked, “How precise is \$267,095 as a measure of the fair value of ArgyleBay’s land held for development at the end of Year 3?” Participants responded on 101-point Likert scales with endpoints 0 (“Very imprecise”) and 100 (“Very precise”).<sup>13</sup>

#### *4.3.2 Hypothesis 2: Valuation*

I measured the effect of the impairment information on valuation judgments with a question adapted from Kadous et al. (2011), who also measured the effect of a change in a fair value on investors’ valuation judgments. Specifically, I asked participants to assess how the impairment recognized in ArgyleBay’s Year 3 financial statements affected the value they would place on the company. Participants responded on a Likert scale with endpoints -100 (“Greatly decreases how much I value the company”) and 100 (“Greatly increases how much I value the company”); the midpoint of the scale was labeled 0 (“Neither increases nor decreases how much I value the company”).

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<sup>12</sup> Teigen and Jørgensen (2005) and others (e.g., Kahneman and Tversky 1982) distinguish between internal and external uncertainty, such that judgments reflect “(1) the judge’s subjective expertise, and (2) the degree of variability believed to be associated with the target value.” Although my prediction is primarily related to (2), I also measured participants’ subjective judgments of their own expertise in order to disentangle these determinants in additional analyses (see additional analyses in Chapter 6 for details).

<sup>13</sup> I also elicited participants’ subjective probability density functions for the estimated fair value, including a median and 5<sup>th</sup> and 95<sup>th</sup> percentiles. The primary purpose of this question was to measure participants’ perceptions of bias in the estimate, but the width of the confidence interval can also be interpreted as a measure of precision. However, I do not detect significant differences in confidence interval width across experimental conditions. Although a substantial literature in psychology confirms that measuring subjective probability density functions is tricky (see, e.g., Soll and Klayman 2004; Teigen and Jørgensen 2005), results of a supplemental experiment provide evidence that investment horizon and disclosed measurement information can jointly affect elicited confidence intervals (see Chapter 7).

## CHAPTER 5

### RESULTS

#### 5.1 MANIPULATION CHECKS

To assess the effectiveness of the investment horizon manipulation, I asked participants whether they assumed the role of an investor considering a “**short-term** investment” or a “**long-term** investment”. Ninety-nine percent of participants (138 of 140) correctly answered this question, indicating a successful manipulation of investment horizon. In addition, because I expected the investment horizon manipulation to instantiate differences in investor mindset, I collected additional corroborative evidence. Specifically, I asked participants to provide written descriptions of ArgyleBay Communities, Inc. in no more than three sentences, using their own words. In order to create a measure of the abstractness of these descriptions, an independent rater and I coded each description. Each description was coded as entirely or mainly abstract (given a value of 1), entirely or mainly concrete (given a value of 0), or a combination of abstract and concrete (given a value of 0.5). The independent rater was told that:

Concrete statements refer to specific, tangible objects. For example, you might describe the act of driving as sitting in a car, pushing the accelerator, and moving the steering wheel to point the wheels in the direction you want to go. This is a concrete description. An abstract description of driving a car might suggest that driving is the act of getting from one place to another. It is abstract because it describes the higher order concept rather than the mechanical specificities of driving. (Alter and Oppenheimer 2008)

The following are examples of descriptions given ratings of 1, 0, and 0.5:

- Coded as 1 (entirely or mainly abstract): “They seem like a company that knows what it takes to succeed. They have correctly predicted their clients’ tastes and matched these with their building projects. They also seem like they’re on the verge of growing even larger and faster than they have been.”

- Coded as 0 (entirely or mainly concrete): “ArgyleBay Communities develops, redevelops, and runs apartment buildings. These buildings are on average 9 years old, newer than the market average. The company has diverse holdings across the United States (many states).”
- Coded as 0.5 (a combination of abstract and concrete): “ArgyleBay Communities is a developer & manager of more than 50,000 housing units in the United States. These communities are built to ensure a more convenient living experience, and often include amenities such as dry cleaning & restaurants. All employees aim to enhance the lives of people living in the communities.”

The coders rated eighty-one percent of the descriptions consistently (Cohen’s  $\kappa = 0.70$ ), and inconsistencies were resolved by mutual agreement. A Mann-Whitney  $U$  test on these ratings shows a significant difference between the ratings of short and long horizon participants. Participants in long horizon conditions provided more abstract descriptions of the firm than those in short horizon conditions ( $Z = 3.49$ ,  $p < 0.001$ , one-tailed). Furthermore, there are no significant differences between disclosure groups within the short or long-horizon conditions (all  $p$ -values  $> 0.311$ , two-tailed).

To assess the effectiveness of the fair value disclosure manipulation, I asked participants which level of the fair value hierarchy the fair value of land held for development was considered to be: “Level 2”, “Level 3”, or “This information was not provided”. Eighty-five percent (119 of 140) of participants correctly answered this question. While this indicates a successful manipulation of fair value disclosures, I discuss participants’ information acquisition further in the additional analyses in Chapter 6.<sup>14</sup>

## 5.2 HYPOTHESIS 1

H1 predicts that, compared to level 2 fair value disclosures, level 3 disclosures will result in a greater reduction in judgments of estimate precision for short horizon investors than for long

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<sup>14</sup> Results are inferentially identical to those reported if I exclude the responses of participants who failed manipulation checks.

horizon investors. Panel A of Table 1 reports cell sizes, means and standard deviations for my two measures of precision. In addition, I perform a factor analysis on these responses to create a single measure of precision. A single factor, labeled “precision score”, explains 80% of the variance in responses (eigenvalue = 1.60).

Because H1 predicts an ordinal interaction (i.e., an asymmetric pattern of cell means), using contrast codes is the most appropriate way to test this hypothesis, improving statistical power over the interaction tested in a conventional ANOVA without increasing Type 1 error rates (Buckless and Ravenscroft 1990). Consistent with the prediction in H1, I apply contrast weights as follows: -3 in the short horizon/level 3 condition, -1 in the long horizon/level 3 condition, and +2 in the level 2 conditions (see, e.g., Rosnow and Rosenthal 1995, p. 7).<sup>15</sup> Results presented in Panel B of Table 1 show that this planned contrast is statistically significant ( $F = 20.98$ ,  $p < 0.001$ , one-tailed), consistent with the predicted interaction (see Panel B of Figure 1).

Results of follow-up simple effect tests presented in Panel C of Table 2 provide further support for the hypothesized interaction. Specifically, participants’ precision scores are significantly lower when disclosures reveal level 3 inputs compared to level 2 inputs, and this is true for both short horizon ( $p < 0.001$ , one-tailed) and long horizon ( $p = 0.009$ , one-tailed) participants. However, when disclosures reveal level 3 inputs, short horizon participants’ precision scores are significantly lower than those of long horizon participants ( $p = 0.075$ , one-tailed). For completeness, I confirm that I do not detect a significant simple effect of horizon given level 2 disclosures ( $p = 0.505$ , two tailed). Further, a semi-omnibus test (untabulated) confirms that the residual variance attributable to main and interactive effects of investment

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<sup>15</sup> I do not expect differences in short and long horizon investors’ precision judgments in level 2 conditions since information about assumptions and processes used to measure fair value is primarily contained in the additional disclosures required for level 3 inputs that are not required for level 2 inputs. The supplemental experiment discussed in Section 7 disentangles the effect of additional disclosures from change in input level.

horizon and fair value disclosures after accounting for my planned contrast is not significant ( $F = 0.43, p = 0.650$ ).

Taken together, these results provide support for H1. Specifically, investment horizon and fair value disclosures jointly affect perceptions of precision in a manner consistent with the hypothesized ordinal interaction.

### 5.3 HYPOTHESES 2A AND 2B

#### *5.3.1 Hypothesis 2a*

H2a predicts that the negative effect of an asset impairment on judgments of firm value will be smaller (larger) for short horizon investors than for long horizon investors when disclosures reveal level 2 (level 3) inputs. Panel A of Table 2 reports cell sizes, means and standard deviations for the effect of the asset impairment on investors' valuation judgments. Because H2a assumes a negative effect of the asset impairment, a traditional analysis of variance (ANOVA) approach does not provide sufficient evidence in isolation, since ANOVA does not test the sign of observed responses. I therefore use a two-step approach to test this hypothesis. First, I use a regression approach to test the negative effect of the asset impairment and the fair value disclosure manipulation. Second, I test the interactive effect of horizon and fair value disclosure level with an ANOVA.

Panel B of Table 2 presents regression models of short and long horizon participants' valuation judgments, with level 2 disclosures coded as zero and level 3 disclosures coded as one. Thus, in each model, the intercept represents the effect of the asset impairment when disclosures reveal level 2 inputs, and the coefficient on the level 3 disclosure variable represents the incremental effect of disclosing level 3 inputs. For short horizon investors, results reveal that, when disclosures indicate level 2 inputs, the effect of the asset impairment on judgments of firm

value is not significantly different from zero ( $\beta = -3.09$ ,  $p = 0.636$ , two-tailed); however, the incremental effect of level 3 disclosure is significantly negative ( $\beta = -20.91$ ,  $p = 0.014$ , one-tailed). In addition, I confirm that the total effect of the asset impairment on short horizon investors' valuation judgments is significantly negative given level 3 disclosure ( $p < 0.001$ , one-tailed). By contrast, for long horizon investors, results reveal that the effect of the asset impairment on judgments of firm value is significantly negative ( $\beta = -12.93$ ,  $p = 0.003$ , one-tailed), but the incremental effect of level 3 disclosure does not differ significantly from zero ( $\beta = -2.36$ ,  $p = 0.705$ , two-tailed). I also confirm that the total effect of the asset impairment on long horizon investors' valuation judgments is significantly negative given level 3 disclosure ( $p = 0.003$ , one-tailed). Consistent with H2a, these results indicate that the asset impairment reduces the value that long horizon investors place on the firm, with no significant effect of disclosed measurement information. In contrast, short horizon investors appear to disregard the negative effect of the impairment when disclosures reveal level 2 inputs, but strongly reduce their valuation judgments when disclosures reveal level 3 inputs.

Next, I test the interactive effect of investment horizon and fair value disclosures on participants' valuation judgments. Table 2, Panel C presents an ANOVA model of the effect of the asset impairment on participants' valuation judgments. Results reveal a significant horizon x fair value level interaction ( $p = 0.048$ , one-tailed), providing further support for H2. This interaction is represented graphically in Panel B of Figure 2. I also observe a significant main effect of fair value level ( $p = 0.019$ , one-tailed), indicating an overall negative effect of moving from level 2 to level 3 inputs on investors' valuation judgments. For completeness, Panel D of Table 2 reports follow-up tests of simple effects by condition. The negative effect of the asset impairment on short horizon investors' valuation judgments is significantly greater when

disclosures reveal level 3 inputs than when they reveal level 2 inputs ( $p = 0.010$ , one-tailed). By contrast, fair value level does not significantly influence long horizon investors' valuation judgments ( $p = 0.761$ , two-tailed). Furthermore, compared to long horizon investors, short horizon investors' valuation judgments are higher (lower) when disclosures reveal level 2 (level 3) inputs. This effect is directionally consistent but not statistically significant at conventional levels when disclosures reveal level 2 inputs ( $p = 0.113$ , one-tailed) and statistically significant when disclosures reveal level 3 inputs ( $p = 0.091$ , one-tailed).

Taken together, these results provide support for H2a, and suggest that investment horizon moderates the effect of fair value disclosures on investors' valuation judgments in a manner consistent with the hypothesized interaction.

### *5.3.2 Hypothesis 2b*

H2b predicts that fair value disclosure level influences the valuation judgments of short horizon investors via differences in judged precision. To test this hypothesis, I conduct a mediation analysis according to the four-step procedure specified by Baron and Kenny (1986). Panel A of Figure 3 summarizes the results of this analysis. Consistent with the results of H2a, step 1 indicates that moving from level 2 to level 3 disclosures negatively affects participants' judgments of firm value ( $p = 0.014$ , one-tailed). Consistent with the results of H1, step 2 confirms that moving from level 2 to level 3 disclosures negatively affects participants' judgments of estimate precision ( $p < 0.001$ , one-tailed). Step 3 confirms that participants' judgments of estimate precision (i.e., the mediating variable) positively influence participants' valuation judgments (i.e., the dependent variable;  $p = 0.006$ , one-tailed). Finally, Step 4 indicates that judgments of estimate precision fully mediate the influence of fair value disclosure level on short horizon participants' valuation judgments, as the effect of disclosure level is no

longer significant when judgments of estimate precision are included in the model ( $p = 0.242$ , two-tailed). In contrast, Panel B of Figure 3 summarizes the same analysis for long horizon participants. This analysis reveals no direct or indirect effect of fair value disclosures on long horizon investors' valuation judgments.

These results provide support for H2b. Specifically, the effect of fair value disclosures on short horizon investors' valuation judgments is fully mediated by their judgments of estimate precision.



## CHAPTER 6

### ADDITIONAL ANALYSES

#### 6.1 ROBUSTNESS TESTS

To demonstrate the robustness of the results presented in Chapter 5 to other potential determinants of investors' precision and valuation judgments, I perform several additional analyses.

##### *6.1.1 Information acquisition*

The results of my hypothesis tests suggest that investment horizon affects investors' evaluation and weighting of disclosed precision information in their judgments. However, differences in investors' acquisition of information may also influence these judgments (Hogarth 1987, Maines and McDaniel 2000). To confirm that the observed effects resulted from participants' evaluation and weighting of disclosed information, rather than their acquisition of the information, I asked participants to recall five pieces of disclosed information: the level of the fair value within the fair value hierarchy, the impaired value of the land held for development, the value of the impairment loss, the explanation for the impairment, and the discount rate used in calculating the recognized fair value.<sup>16</sup> Correct responses to each question average 89.5% for short horizon investors and 89.0% for long horizon investors, suggesting a high overall level of acquisition. In addition, to create an overall measure of information acquisition, I sum the number of correct and incorrect responses for each participant. The pattern of correct versus incorrect responses does not differ significantly between short and long horizon investors ( $\chi^2 = 0.72$ ,  $p = 0.868$ , two-tailed), suggesting that differences in information

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<sup>16</sup> Because some of this information was only provided in certain conditions (for example, only participants in level 3 disclosure conditions were provided with cost of capital information), one of the multiple choice options was "this information was not provided".

acquisition are unlikely to account for the observed differences in the judgments of short and long horizon participants.

#### *6.1.2 Measurement bias*

Compared to fair values that are estimated using level 2 inputs, the additional subjectivity in level 3 inputs may lead to additional bias as well as random error; thus, bias may contribute to investors' certainty that an estimate reflects an item's true fair value. To construct a measure of perceived bias in the fair value estimate, I subtract the recognized fair value of ArgyleBay's land held for development from the value at which participants believe it is "equally likely" that the actual fair value is higher or lower. An ANOVA reveals an overall increase in perceived bias when moving from level 2 to level 3 inputs ( $F = 4.05$ ,  $p = 0.047$ , two-tailed), but no main or interactive effects of investment horizon (both  $p$ -values  $> 0.303$ , two-tailed). Thus, although participants recognize the increased potential for bias when estimates are derived using unobservable inputs, I find no evidence that investment horizon significantly moderates this effect. Further, when I repeat the mediation analysis used to test H2b with bias as the mediator, I find that short horizon participants' judgments of bias do not mediate the relation between fair value disclosures and valuation.

#### *6.1.3 Investors' subjective expertise*

Teigen and Jørgensen (2005) and others (e.g., Kahneman and Tversky 1982) distinguish between internal and external uncertainty, such that judgments reflect "(1) the judge's subjective expertise, and (2) the degree of variability believed to be associated with the target value." Although H1 is related to investors' perceptions of external uncertainty, I also measured subjective expertise by asking, "How confident are you in your ability to assess whether \$267,095 is a reasonable measure of the fair value of ArgyleBay's land held for development at

the end of Year 3?” To test whether my results are robust to controlling for participants’ subjective expertise, I include this measure as a covariate in my test of H1. Controlling for participants’ subjective expertise, I observe a pattern of cell means that is very similar to that displayed in Panel B of Figure 1, and the contrast used to test H1 remains highly significant ( $F = 17.30, p < 0.001$ , one-tailed).<sup>17</sup>

## 6.2 INVESTOR NUMERACY

I collected a measure of participants’ numeracy to include as a covariate in my analyses. Numeracy is “the ability to understand and use numerical information” (Reyna et al 2009, p. 1), and differences in numeracy have been cited in other contexts, including medical decision making (e.g., Reyna et al. 2009) and general decision making (e.g., Peters et al. 2006), as drivers of decision makers’ susceptibility to extraneous factors. Numeracy is a natural moderator of judgments in a financial reporting context because of the quantitative nature of much financial information. In addition, numeracy may be correlated with the processing fluency of financial statement information, because more numerate users should feel more at ease when reading and using quantitative information, and processing fluency has been found to influence investor judgments (e.g., Rennekamp 2011). To date, however, little research has examined the ways in which numeracy interacts with other determinants of financial judgments and decisions.

I measured participants’ numeracy using the 11-item Numeracy Scale developed by Lipkus et al. (2001). Although the scale was developed in the context of medical decision making, and contains several questions directly related to health numeracy, it has also been used in general decision making settings as a measure of individual differences in numeracy (see, e.g., Peters et

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<sup>17</sup> Further analyses confirm that the significance of this contrast is robust to controls for participants’ judgments of short-term and long-term risk, as well as perceptions of management competence and the credibility of management’s assertion that the recognized value represents the actual fair value of the land held for development (all p-values < 0.001, one-tailed).

al. 2006). Furthermore, in contrast to most other numeracy scales, the scale was developed using a relatively highly educated sample (i.e., with more than a high school education), suggesting that it is likely to capture variability in the numeracy of my masters student participants. My measure of numeracy is the total number of correct responses to the 11 items in this scale.

To provide some initial evidence on the influence of numeracy on investor judgment, I include this measure of numeracy as a covariate in my hypothesis tests. I find that numeracy has a negative effect on the overall level of precision associated with the recognized fair value ( $F = 5.25$ ,  $p = 0.024$ , two-tailed), consistent with numeracy generally decreasing perceptions of precision in financial statement estimates. I also observe a negative effect of numeracy on value; however, the effect is not statistically significant ( $F = 1.38$ ,  $p = 0.243$ , two-tailed). In addition, I confirm that my hypothesis tests are robust to including numeracy as a covariate. The weighted linear contrast that I use as my primary test of H1 remains highly significant ( $F = 25.70$ ,  $p < 0.001$ , one-tailed); in addition, after controlling for numeracy, simple effects are inferentially identical. Results for valuation judgments are also robust to including numeracy as a covariate: the interactive effect of horizon and fair value level on valuation judgments remains significant at  $p = 0.0390$ , one-tailed, and simple effects are inferentially identical. In general, I observe a small to moderate increase in the statistical significance of my hypothesis tests after controlling for numeracy, suggesting that controlling for individual differences in numeracy increases power by accounting for some of the variance in my dependent measures. Overall, these results suggest that numeracy warrants additional investigation as a determinant and moderator of investor judgment.

### 6.3 PRECISION JUDGMENTS IN THE ABSENCE OF DISCLOSURE

The literature reviewed in Chapter 2 highlights concerns about investors attributing a relatively high level of precision to recognized accounting estimates. Theory also suggests a default view of estimates as relatively precise in the absence of disclosure. Theories of human information processing suggest that people store information in memory as mental representations (e.g., Carlston and Smith 1996; Wyer 2004, 2007). One type of mental representation is a *generalized entity representation*, which consists of a referent and the attributes that characterize the referent.<sup>18</sup> Generalized entity representations are often depicted metaphorically as associative networks, with the referent and associated attributes represented by nodes in memory (Wyer 2004). For example, Figure 4 presents a metaphorical representation of the general category “financial statement item” and associated attributes “relevant”, “reliable” and “precise”, as they might be stored in the memory of a financial statement user. The pathways between the attributes and either the referent or other attributes represent associations that are formed when the user thinks about one element in relation to another; the more the user thinks about these relations, the stronger the association (Wyer 2007).

The associations depicted in Figure 4 are suggested by theory and previous empirical results. Specifically, the traditional dominance of historical information in financial reporting suggests that users’ initial experiences with financial statement information lead them to associate financial statement items with a high level of precision, and these initial experiences form the basis for a more generalized representation that is stored in memory. Once established, the propagation of the “resilient myth” of financial statements as fact serves to regularly strengthen this association (Peecher et al. 2010). Furthermore, evidence that users confuse or conflate

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<sup>18</sup> Most of the work on generalized entity representations has been in social psychology and has therefore focused on representations of people, traits and behaviors. However, the general theory may apply to “specific persons, objects, or places or to more general groups or categories.” (Wyer 2007, p. 289).

reliability and precision (e.g., FASB 2010, Journey 2010) suggests the association in Figure 4 between “precise” and “reliable” and a further strengthening of the main link between financial statement items and precision. Finally, the dashed line between “precise” and “relevant” represents the normative association that is suggested by statistical decision theory and SFAC 8, but for which there is little descriptive evidence thus far.

In the absence of estimate-related disclosures, I expect that investors will base their judgments on attributes associated with the generalized representation of financial statement items that they hold in memory, leading them to attribute a relatively high level of precision to financial statement items. To make this a testable prediction, I define fair value estimates derived using level 3 inputs as relatively imprecise and those derived using level 2 inputs as relatively precise, and predict that, in the absence of disclosure, investors will judge recognized fair values to be closer in precision to the latter than the former.<sup>19</sup>

To provide evidence of the default level of precision that investors attribute to a recognized estimate in the absence of disclosure, I compare precision scores in disclosure conditions to those in the control conditions (in which participants were not provided with disclosures). Results indicate that precision scores are significantly lower in level 3 conditions than in control conditions for both short horizon investors (control mean = 0.11, level 3 mean = -0.70,  $t = 2.62$ ,  $p < 0.01$ , one-tailed) and long horizon investors (control mean = 0.28, level 3 mean = -0.32,  $t = 2.27$ ,  $p = 0.01$ , one-tailed).<sup>20</sup> By contrast, precision scores for level 2 conditions do not differ

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<sup>19</sup> Defining estimates derived using level 3 inputs as relatively imprecise compared to those derived using level 2 inputs is consistent with the view reflected in standards that there is a qualitative difference between observable and unobservable inputs. This view is reflected in, e.g., the US GAAP requirement that (1) unobservable inputs be used only when observable inputs are not available (FASB ASC 820-10-35-53), and (2) firms provide additional disclosures about the assumptions and valuation techniques used to measure estimates derived using level 3 inputs (FASB 2011a, ASC 820-10-50-2).

<sup>20</sup> Theory would not predict an effect of investment horizon on precision judgments in the absence of disclosure, and comparing mean precision scores in short and long horizon control conditions reveals no significant differences ( $t = 0.58$ ,  $p = 0.56$ ).

significantly from those in control conditions (both p-values > 0.33, two-tailed). In addition, to establish the overall level of participants' precision judgments in the absence of disclosure, I compare control condition participants' mean responses on the two measures of precision to 50, which is the midpoint of the scale. For *Precision\_1*, the mean response is significantly higher than the midpoint (mean = 60.00, std dev = 21.53,  $p < 0.01$ , one-tailed). For *Precision\_2*, the mean response is marginally significantly higher than the midpoint (mean = 54.13, std dev = 22.40,  $p = 0.10$ , one-tailed). Taken together, these results suggest that, in the absence of disclosure, investors attribute a relatively high default level of precision to a recognized estimate. This evidence is consistent with concerns about an illusion of precision in financial statement estimates, even among a relatively knowledgeable group of financial statement users (i.e., masters of accountancy students).

## CHAPTER 7

### SUPPLEMENTAL EXPERIMENT

I conducted a supplemental experiment that complements and extends the findings from my primary experiment in two key ways. First, it uses an alternative manipulation of temporal orientation that abstracts away from factors other than investor mindset that might influence the relative importance of disclosed measurement information to short and long horizon investors. Second, it examines the *incremental* impact of including detailed quantitative information in level 3 fair value disclosures. My primary experiment jointly manipulates input level within the fair value hierarchy with the provision of additional disclosures required for level 3 inputs. While this choice tests the implications of existing standards, it does not allow me to disentangle the effect of differences in input level (i.e., level 2 versus level 3) from the effect of additional disclosures. I address this issue in a supplemental experiment by holding input level constant and testing the incremental effect of providing additional disclosures. Furthermore, examining the effect of disclosing more detailed quantitative information is important because a recent update to US generally accepted accounting principles (GAAP) and international financial reporting standards (IFRS) has introduced new requirements for quantitative disclosures related to level 3 inputs (FASB 2011b).

#### 7.1 HYPOTHESIS 3: THE EFFECT OF DISCLOSING DETAILED QUANTITATIVE INFORMATION IN LEVEL 3 FAIR VALUE DISCLOSURES

Following the theory underlying my primary hypotheses, I expect detailed quantitative disclosures to have a greater effect the precision judgments of investors with a short-term orientation because of the concrete mindset which they process financial statement information. As discussed in the development of H1 and H2, concrete mindsets tend to emphasize the



peripheral or incidental features of a phenomenon. Thus I expect disclosing detailed quantitative assumptions to increase the salience of measurement error and the diversity of possible outcomes among investors with a short-term orientation, resulting in lower judgments of precision when this information is provided than when it is not. By contrast, I expect these additional quantitative disclosures to have little influence on the judgments of investors with a long-term orientation. This leads to the following hypothesis:

**H3:** Judged precision will be lowest when investors have a *short-term* orientation and quantitative estimate-related disclosures are *provided*.

## 7.2 SUPPLEMENTAL EXPERIMENT: METHOD

### 7.2.1 Design Overview

I conducted an experiment with a full-factorial 2 x 2 between subjects design, with temporal orientation (short-term vs. long-term) and quantitative estimate-related disclosures (provided vs. not provided) as independent factors. I manipulated temporal orientation by asking participants to predict the final two digits (the tenths and hundredths places) of the stock price of AvalonBay Communities (NYSE ticker symbol: AVB), the actual real estate firm on which the hypothetical firm in my primary experiment was based. Participants in short-term conditions predicted what the final two digits would be 15 minutes from the time that all predictions were collected, while participants in long-term conditions predicted what these two digits would be one week from the date of the session. I manipulated the presence or absence of quantitative disclosures by either providing or not providing a detailed calculation of the fair value of land held for development that had suffered an impairment loss during the year.

Participants were 79 undergraduate business students from the University of Illinois at Urbana-Champaign. Eight participants provided incomplete or uninterpretable responses to the

dependent measure for Hypothesis 3, so I use only the remaining 71 participants in my analyses.<sup>21</sup> At the time of the experiment, all participants had completed two semesters of intermediate financial accounting. I selected this participant group because they were familiar, via their coursework, with the recognition and disclosure of accounting estimates, relevant fair value measurement techniques, and the fair value hierarchy defined in FASB ASC 820. Thus, although they were not quite as experienced as the participants in my primary experiment, I believe that these participants are appropriately matched to the requirements of the experimental task, which was an abridged and simplified version of the task in my primary experiment (Peecher and Solomon 2001).

### *7.2.2 Case materials and procedures*

The experiment took place during two sessions of an intermediate financial accounting class. Session 1 was arbitrarily designated as the short-term session and Session 2 as the long-term session. Each session included both levels of the disclosure manipulation.

#### *7.2.2.1 Temporal Orientation Manipulation*

After participants read and signed a consent form, AVB's stock price was displayed on a large screen at the front of the room. Participants could observe real-time changes in AVB's stock price, with numbers briefly changing to green (red) to indicate an uptick (downtick) in price. Participants were then informed that they would have the opportunity to win a \$100 gift card from Amazon.com, and that the winner would be the person who came closest to predicting the last two digits (the tenths and hundredths places) of AVB's stock price at the end of either 15 minutes (short-term) or one week (long-term). Each participant then recorded and submitted a

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<sup>21</sup> Of these eight participants, three provided only an upper or lower bound for the elicited confidence interval, which was the dependent measure for H3. Two participants' provided 5<sup>th</sup> and 95<sup>th</sup> percentile responses of less than 5,000 (compared to overall means of more than 200,000), indicating that these participants did not understand the question. Furthermore, these responses are more than four (three) standard deviations smaller than the mean of other participants' 5<sup>th</sup> (95<sup>th</sup>) percentile responses. Finally, three participants provided estimates of the confidence interval around the impairment loss, rather than the fair value estimate.

two-digit number (from 00 to 99), along with their name and email address, before completing the remaining materials anonymously. All winners (regardless of session) received their electronic gift cards by email one week after the sessions took place.

Information about this procedure was provided to participants on a “Stock Price Prediction Sheet”, and all participants submitted their predictions on this sheet prior to completing the remaining materials. Thus, the only difference between the short-term and long-term sessions was the length of the specified period (either 15 minutes or one week). Given the frequent up and down movements of AVB’s stock price, this manipulation ties participants’ outcomes to the performance of AVB’s stock over a relatively short or long period. However, because stock prices move stochastically, predicting the tenths and hundredths digits did not require participants to perform any fundamental or technical analyses to make their prediction. Thus the manipulation abstracts away from factors other than temporal orientation that might influence the relative importance of disclosed measurement information to short and long-horizon investors, allowing for a clean manipulation of the temporal dimension of investment horizon.

#### 7.2.2.2 Case materials and disclosure manipulation

As in my primary experiment, participants received background information about the firm and responded to process measures designed to measure psychological distance and construal level. Next, participants viewed two line items and a note related to an impairment loss on land held for development. In all conditions, the note contained qualitative information about the reason for the impairment charge and the analysis used to determine the fair value of the land, including the designation of the fair value estimate as a level 3 price in the fair value hierarchy. In addition, participants in *quantitative disclosure provided* conditions received more detailed

quantitative information about the fair value calculation, including estimates of future cash flows and the discount rate. Appendix C contains details of the quantitative disclosure manipulation.

After reviewing financial statement information, participants responded to dependent measures and post-task questions.

### *7.2.3 Dependent measure*

I measured precision by eliciting a 90% confidence interval for the estimated fair value of the land held for development. Recall that, in my primary experiment, I did not find any significant differences in the width of participants' elicited confidence intervals. In this experiment, by eliciting only an upper and a lower bound and using confidence interval width as my sole measure of participants' precision judgments, I give this measure its "best shot" at obtaining, since eliciting a midpoint and placing this question after two other measures of precision may have reduced the diagnosticity of the measure in my primary experiment. My dependent measure in testing H3 is the width of the elicited confidence interval (higher bound minus lower bound). Since I define precision as the degree of error or uncertainty in measurement, precision should be inversely related to the width of the confidence interval. If, following the analytical literature, I define precision as the inverse of variance (or more specifically, its square root), the relationship between a 90% confidence interval  $C$  and precision  $1/\sigma$ , the relationship can be formally expressed, for any sample size  $n$ , as follows:

$$C = \left[ \bar{X} + 1.96 \frac{\sigma}{\sqrt{n}} \right] - \left[ \bar{X} - 1.96 \frac{\sigma}{\sqrt{n}} \right] = 3.92 \frac{\sigma}{\sqrt{n}}$$

$$\frac{1}{\sigma} = 3.92 \frac{\sqrt{n}}{C}$$

Thus precision is inversely related to the width of the confidence interval. The predicted effects of temporal orientation and quantitative estimate-related disclosures on confidence interval width are depicted in Panel A of Figure 5.

### 7.3 SUPPLEMENTAL EXPERIMENT: RESULTS

#### 7.3.1 *Manipulation Checks*

To assess the effectiveness of the temporal orientation manipulation, I asked participants to identify whether the winner of the gift certificate would be determined based on the last two digits of AVB's "stock price **15 minutes** after the start of the session" or "closing stock price **one week** from today". All participants correctly answered this question. To assess the effectiveness of the disclosure manipulation, I asked participants to identify whether they had been provided with "a detailed calculation of the fair value of land held for development, including estimates of revenue, expenses, free cash flows and the discount rate based on AVB's weighted cost of capital." Eighty-seven percent of participants correctly answered this question.<sup>22</sup>

As in my primary experiment, I also collected corroborating evidence that my temporal orientation manipulation affected psychological distance and construal level. First, participants in short-term conditions provided more abstract descriptions of the firm than those in long-term conditions ( $Z = 2.18$ ,  $p = 0.01$ , one-tailed). Furthermore, there are no significant differences between disclosure groups within the short or long-term conditions (both  $p$ -values  $> 0.41$ , two-tailed).<sup>23</sup> Second, participants estimated the distance from their location in Champaign, Illinois

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<sup>22</sup> Results reported below are inferentially identical if I exclude participants who failed this manipulation check.

<sup>23</sup> Because this experiment focuses specifically on the effect of quantitative information, I also coded descriptions for the presence (1) or absence (0) of quantitative detail about the firm as an alternative measure of abstractness/concreteness. In the short-term condition, 13 of 34 responses (38.2%) contained quantitative detail about the firm, while only 3 of 37 responses (8.1%) contained quantitative details among long-term participants.

to AVB headquarters in Arlington, Virginia.<sup>24</sup> Consistent with differences in temporal orientation instantiating similar differences in perceived geographic distance (another psychological distance dimension), short-term participants' mean estimate of the distance was 784.76 miles (std dev = 248.75), while long-term participants' mean estimate was 950.11 miles (std dev = 456.99), a difference of 165.35 miles. This difference is statistically significant ( $t = 1.87$ ,  $p = 0.03$ , one-tailed). Furthermore, there are no significant differences between disclosure groups within the short or long-term conditions (both  $p$ -values  $> 0.20$ , two-tailed).

### 7.3.2 Hypothesis 3

H3 predicts that confidence interval width will be largest when short-term investors are provided with quantitative disclosures. Panel A of Table 3 reports cell sizes, means and standard deviations of the upper and lower bounds of participants' elicited confidence intervals and the constructed width of these intervals (see also Figure 5).<sup>25</sup>

To test the ordinal interaction predicted in H3, I apply contrast weights as follows: +3 in the *short-term/disclosure provided* condition, and -1 in the other three conditions. Specifically, this contrast tests whether the width of the confidence interval is greatest (i.e., precision is least) when short-term participants are provided with quantitative disclosures. Results presented in Panel B of Table 3 show that the planned contrast is statistically significant ( $F = 7.44$ ,  $p < 0.01$ , one-tailed), consistent with the predicted interaction. Results of follow-up simple effect tests presented in Panel C of Table 3 show a significant effect of temporal orientation when

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This difference is statistically significant ( $\chi^2 = 9.21$ ,  $p < 0.01$ ). By contrast, I detect no significant differences between disclosure groups within either temporal orientation condition (both  $p$ -values  $> 0.48$ , two-tailed).

<sup>24</sup> According to Google Maps ([www.google.com/maps](http://www.google.com/maps)), the shortest driving distance between Champaign and Arlington is 713 miles.

<sup>25</sup> Although I observe a pattern of cell means in both the upper and lower bound that is consistent with the lowest degree of judged precision in the short-term/quantitative disclosures present cell, the pattern appears to be more pronounced for the upper bound. However, this appears to be caused primarily by a single observation. Excluding this observation results in a mean (std dev) of 209,838.61 (69,292.89) for the lower bound and 315,121.67 (76,067.82) for the upper bound, resulting in a confidence interval width of mean 105,283.06 and standard deviation of 107,617.72. Results remain inferentially identical if I exclude this observation.

quantitative disclosures are provided ( $F = 5.71$ ,  $p = 0.01$ , one-tailed), and a significant effect of providing quantitative disclosures given a short-term orientation ( $F = 4.27$ ,  $p = 0.02$ , one-tailed). For completeness, I confirm that I do not detect a statistically significant effect of temporal orientation when quantitative disclosures are not provided ( $F = 0.05$ ,  $p = 0.96$ , two-tailed), or a statistically significant effect of providing quantitative disclosures given a long-term orientation ( $F = 0.28$ ,  $p = 0.78$ , two-tailed). Overall, these results provide support for H3. Specifically, investors with a short-term orientation judge a fair value estimate derived using significant unobservable inputs to be significantly less precise when they are provided with detailed quantitative disclosures; by contrast, I observe no significant effect of providing quantitative disclosures on the precision judgments of investors with a long-term orientation.

### *7.3.3 Additional Analysis: Quantifying the effects of temporal orientation and quantitative disclosures on perceptions of precision*

The differences in the confidence intervals reported in the results of H3 appear to be quite large, but what do they imply about the level of judged precision in AVB's fair value estimate? To measure the level of error implied by these confidence intervals, I calculate the change in (1) discount rate and (2) underlying cash flows that would be necessary to justify the mean upper and lower bounds in each condition, holding all else constant.

The discount rate used in the disclosed discounted cash flow analysis is 9.8%. Holding all else constant, the discount rate implied by the upper (lower) bound of the confidence intervals provided by short-term participants who were provided with quantitative disclosures is 5.9% (13.4%), a difference of 7.5%. By contrast, the average upper and lower bound rates implied in the other three conditions are 8.8% and 12.6%, respectively, a difference of 3.8%. Alternatively, the sum of the undiscounted cash flows assumed in the disclosed analysis is \$534,892. Holding

all else constant, the undiscounted cash flows implied by the upper (lower) bound of the confidence intervals provided by short-term participants who were provided with quantitative disclosures is \$698,268 (\$422,859), a difference of \$275,409 or 3.7% of AVB's total assets. In contrast, the average upper and lower bound cash flows implied in the other three conditions are \$570,990 and \$445,093, a difference of \$125,897, or 1.7% of total assets. Thus differences in perceptions of precision appear to have economically significant implications for these underlying assumptions.



## CHAPTER 8

### DISCUSSION AND CONCLUSION

#### 8.1 SUMMARY OF FINDINGS

This study presents theory and evidence consistent with the prediction that the effect of estimate-related disclosures on investors' precision and valuation judgments depends jointly on disclosure content and investor mindset. Specifically, I find that the negative effect of level 3 fair value disclosures on investors' judgments of estimate precision is amplified by a concrete mindset associated with a short investment horizon. The joint effect of mindset and fair value disclosures on investors' valuation judgments is even more striking. Consistent with construal level theory from psychology, my results suggest that, compared to long horizon investors, short horizon investors underweight the negative economic implication of an asset impairment when estimate precision is relatively high, but strongly reduce the value they place on the firm when the impaired asset is measured with a low degree of precision. By contrast, differences in estimate precision do not significantly alter the impact of an asset impairment on long horizon investors' valuation judgments. In a supplemental experiment, I use an alternative manipulation of temporal orientation to instantiate investor mindset, and find that proposed quantitative disclosures significantly reduce the precision judgments of participants with a short-term orientation, but do not significantly impact the judgments of participants with a long-term orientation.

#### 8.2 NORMATIVE CONCLUSIONS

There are at least two perspectives on how estimate precision *should* influence investors' judgments about firm value based on existing normative and descriptive models of decision

making under uncertainty. In this section, I summarize these two perspectives, discuss their implications for the setting I examine, and compare these implications to my results.

The first perspective, which I will call the “rational Bayesian” perspective, is related to the idea expressed in SFAC 8 that precision is related to relevance (FASB 2011a). As I discuss in Chapter 2, this notion of a normative relation between precision and relevance comes from statistical decision theory and Bayesian inference. A rational Bayesian decision maker revises his or her prior belief about a phenomenon when new information about the phenomenon becomes available. The greater the precision of the new information, the more weight it receives in forming the posterior belief. In the context of judging the effect of an asset impairment on firm value, this perspective would predict a more strongly negative effect of a more precisely measured impairment. According to this perspective, moving from level 2 to level 3 inputs in my experimental should have a *positive* impact on firm value. Thus, the negative effect of level 3 disclosures on value that I predict in H2a and the positive effect of precision on value that I predict in H2b are inconsistent with this rational Bayesian perspective.

The second perspective, which I will call the “situational risk” perspective, relaxes the assumptions of the rational Bayesian perspective in two ways. First, it assumes that investors overweight downside uncertainty compared to upside uncertainty associated with an estimate. This assumption is consistent with, e.g., the asymmetric sensitivity to gains and losses in prospect theory (Kahneman and Tversky 1979). In the context of an asset impairment, this would allow for a *positive* relation between precision and value (and thus a *negative* effect of moving from level 2 to level 3 inputs), because of the greater downside risk associated with a less precise estimate. Second, the situational risk perspective assumes that short horizon investors are more sensitive to this downside risk than long horizon investors. This differential

sensitivity may be rooted in rationality, since unpredictable negative shocks to a firm's share price are less likely to be dominated by fundamentals in the short run than in the long run. However, my results strongly suggest that this differential sensitivity becomes overgeneralized (and thus consistent with an irrational effect of mindset) in the context of judging firm value for two reasons.

First, the rational basis for short horizon investors' greater sensitivity to downside risk is related to *price*, not value. According to standard models of firm value, any risk that the impaired value of the asset will decline further should affect firm value via estimated future performance (e.g., residual earnings or cash flows) and/or the discount rate applied to this future performance. However, value equals the time-discounted value of *all* future cash flows, not only those that are likely to be realized within the investors' horizon, and the discount rate applied equals the *firm's* cost of capital, and not the individual investor's required rate of return. Thus, although the price (or the price-to-value ratio) at which short and long horizon investors are willing to invest might reasonably differ on this basis, judgments of firm *value* should not vary systematically with situational, horizon-based differences in risk tolerance.

Second, even allowing that differences in situational risk tolerance could influence responses to my measure of value, the situational risk perspective implies a *main effect* of horizon (in addition to an interactive effect of horizon and fair value level arising from differential sensitivity to uncertainty). Specifically, because there is a nontrivial level of downside uncertainty associated with both level 2 and level 3 inputs, this perspective implies that the negative effect of the impairment should be stronger for *both* levels of my fair value level manipulation. However, I find no evidence of a main effect of horizon on judgments of firm value ( $F = 0.00$ ,  $p = 0.996$ , two-tailed). Rather, I find that the effect of horizon is conditional on

the precision of the measurement, in that short horizon investors *discount* the effect of the impairment compared to long horizon investors when it is measured relatively precisely and *amplify* it when it is measured imprecisely. Moreover, on average, short horizon investors recognize the negative effect of the impairment *only* when it is measured imprecisely, and the variation in their valuation judgments is fully explained by their precision judgments. In contrast to the results for short horizon investors, I observe no significant effect of fair value level or judged precision on long horizon investors' valuation judgments. To the extent that the situational risk perspective would predict a negative effect on value of a less precise estimate (because of the overweighting of downside risk), this null effect for long horizon investors also runs counter to this perspective.<sup>26</sup>

Thus, the effects of the impairment and related disclosures on participants' valuation judgments differ from the predictions of both the rational Bayesian and situational risk perspectives. By contrast, the mindset perspective that I articulate in Chapter 3 provides a relatively parsimonious explanation for the observed pattern of results.

### 8.3 CONTRIBUTIONS, LIMITATIONS AND FUTURE WORK

As the first study to consider a contextual determinant of investor mindset and consequent effects of mindset on investors' judgments, the theory and findings I present here make several contributions. Specifically, I provide initial evidence that investor mindset varies systematically with investment horizon. While horizon is important because it plays a key role in many

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<sup>26</sup> I acknowledge that it is difficult to draw conclusions on the basis of a null result. Some sources advocate using an observed power analysis to provide evidence that the null hypothesis is true (for a discussion, see Hoenig and Heisey 2001). The argument in favor of such an analysis is that the evidence for the null is strengthened if statistical significance is not achieved despite observed power being high (or conversely that evidence for the null hypothesis is weak if observed power is low). However, as Hoenig and Heisey (2001) demonstrate: "Observed power can never fulfill the goals of its advocates because the observed significance level of a test ("*p* value") also determines the observed power; for any test the observed power is a 1:1 function of the *p* value". With this in mind, I can simply point out that the overall pattern of results is consistent with my *ex-ante* expectations, which are consistent with an influence of mindset on valuation judgments, but inconsistent with the two perspectives outlined in this section.

investment decisions, it is just one of several likely determinants of investor mindset in the financial reporting environment. Thus, the theory and evidence presented here is likely to be useful in understanding a range of phenomena beyond the effects of horizon. In addition, I find that estimate-related disclosures interact with investor mindset to influence investors' judgments of estimate precision and the value they place on a firm. A key takeaway of my study for professionals and standard setters is that contextual variables, such as investment horizon, likely interact with the information environment to influence investors' judgments and decisions in unexpected ways.

My findings are also subject to certain limitations, which in turn raise interesting questions for future research. First, although I find that investment horizon influences judgments of estimate precision and firm value because of differences in mindset, considering a relatively short or long investment horizon may also instantiate situational differences in investors' risk tolerance. As a result, although the pattern of results that I predict and find is inconsistent with standard models of firm value, future research could investigate the way in which situational risk tolerance associated with investment horizon affects the way in which investors' valuation judgments articulate with the price at which they are willing to commit their capital to a firm. Second, the multiple psychological distance dimensions identified in the psychology literature suggest another area for future work. Thus, although I focus here on differences in temporal orientation associated with investment horizon, future work might consider other determinants and consequences of investor mindset, including both main and interactive effects. Third, there are multiple ways in which an illusion of precision might manifest itself in financial statements. While I consider a context in which disclosures reveal information about the assumptions and processes underlying the valuation of a single line item, financial statement items covary in ways

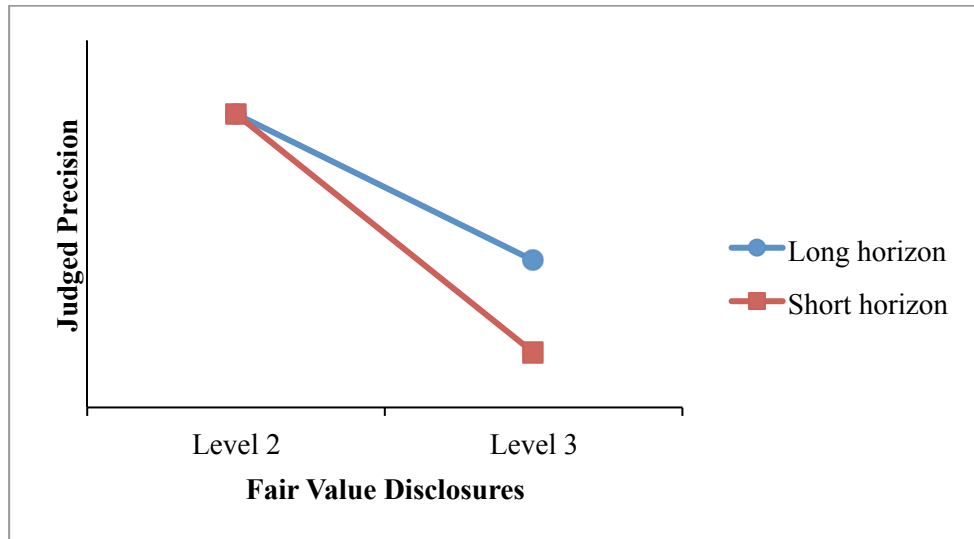
that may amplify or attenuate the effect of alternative assumptions on firm performance and value. Although a concrete mindset appears to magnify the effect of disclosures in my setting, a user with a relatively abstract mindset may be more likely to recognize the way in which financial statement items covary. Finally, my study considers the effect of estimate-related disclosures and mindset on the judgments of nonprofessional investors. Future research could consider whether experts (e.g., analysts) exhibit similar judgments in response to determinants of mindset, or whether, for example, they systematically approach their analyses with a concrete mindset because of a chronic psychological proximity to information in their field of expertise.

## CHAPTER 9

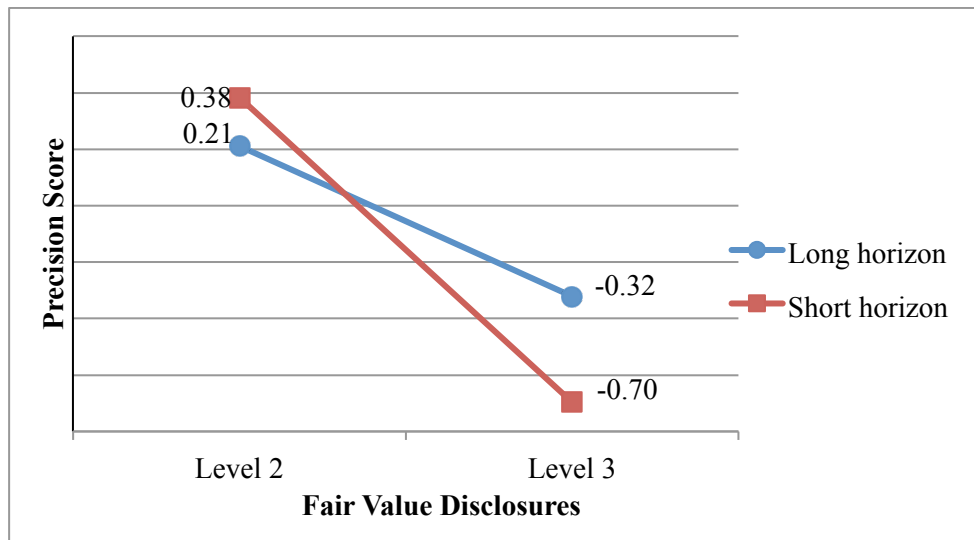
### FIGURES AND TABLES

Figure 1. Effect of Fair Value Disclosures and Investment Horizon on Precision Judgments (H1)

Panel A: Predicted Effects



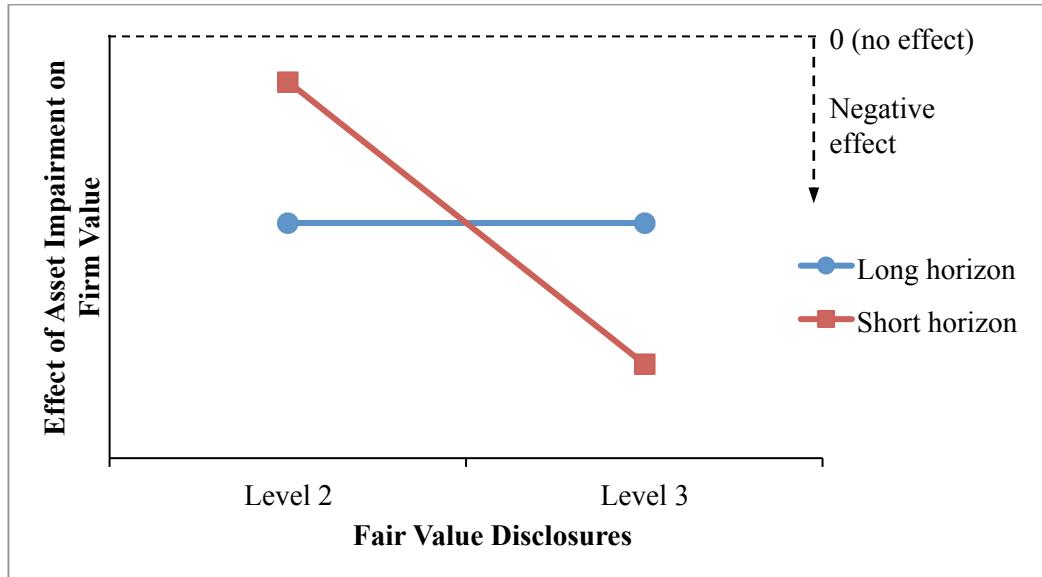
Panel B: Observed Effects



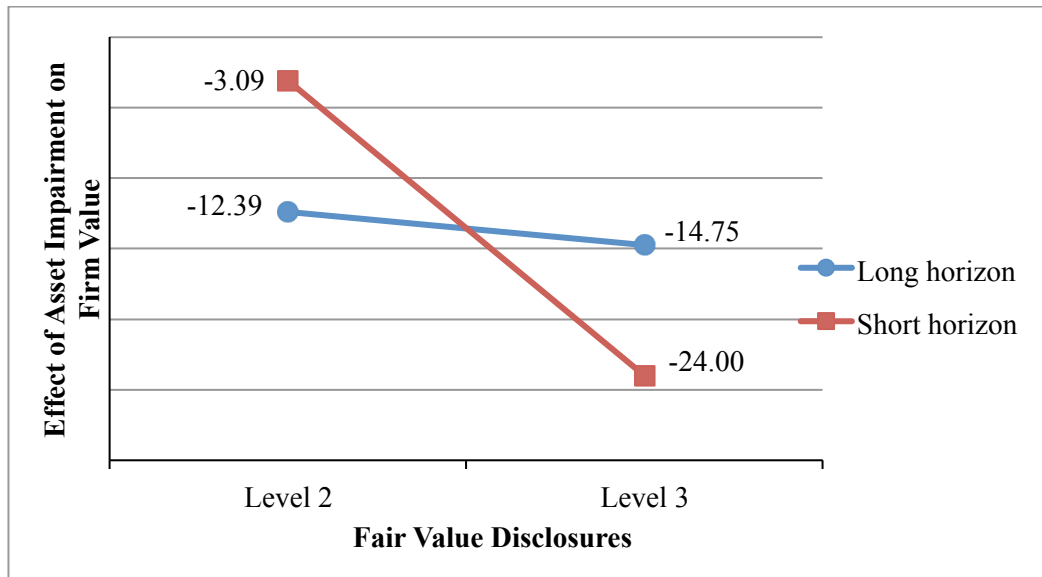
Panel A depicts the pattern consistent with the hypothesized ordinal interaction of *investment horizon* and *fair value disclosures* on participants' precision judgments (H1). The prediction in H1 maps reasonably in contrast weights of +2 -3 +2 -1 for short horizon/level 2; short horizon/level 3; long horizon/level 2; and long horizon/level 3 conditions. Panel B depicts the observed pattern of participants' precision judgments (see Table 1, Panel A). This pattern is tested using the planned contrast presented in Panel B of Table 1.

Figure 2. Effect of Fair Value Disclosures and Investment Horizon on Valuation Judgments (H2a)

*Panel A: Predicted Effects*



*Panel B: Observed Effects*

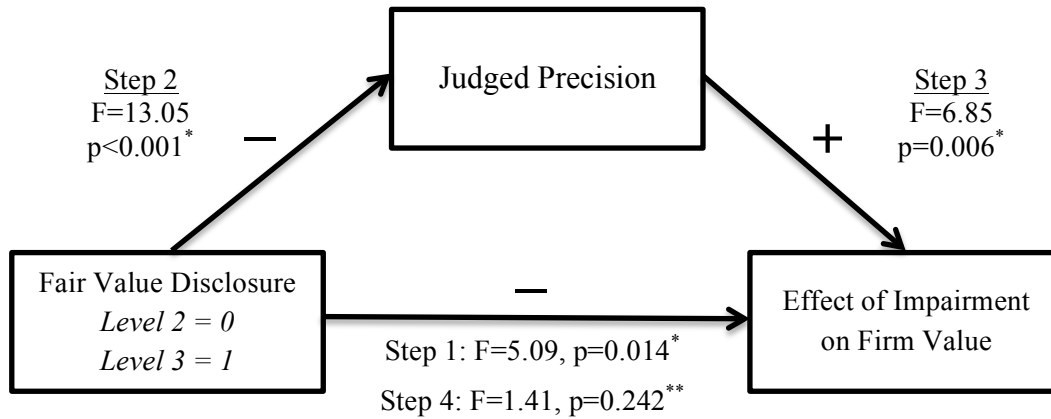


Panel A depicts the pattern consistent with the hypothesized interactive effects of *investment horizon* and *fair value disclosures* for the influence of an asset impairment on investors' judgments of firm value (H2a). Panel B depicts the observed pattern of cell means participants' valuation judgments (see Table 2, Panel A). This pattern is tested using the regression and ANOVA presented in Panels B and C of Table 2.

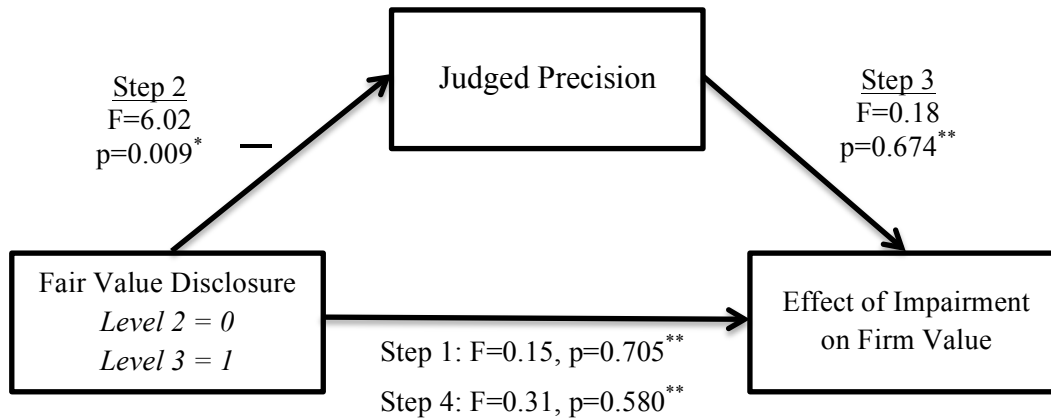


Figure 3. The Mediating Role of Judged Precision in the Relation between Fair Value Disclosures and the Effect of an Impairment Loss on Investors' Valuation Judgments (H2b)

*Panel A: Short Horizon Investors*



*Panel B: Long Horizon Investors*

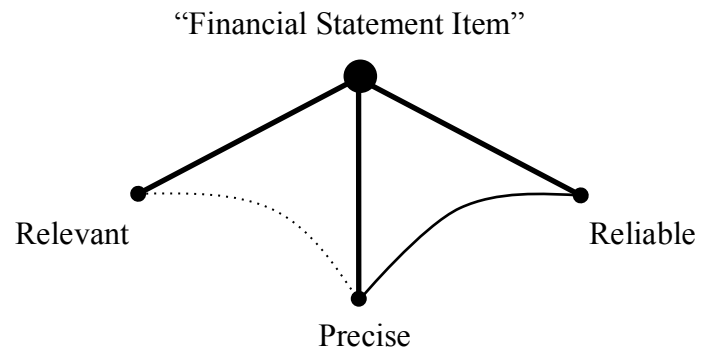


This figure summarizes tests of the mediating role of judged precision in the causal relation between fair value disclosure level and the effect of an asset impairment on participants' judgments of firm value. Panel A (B) presents results for participants acting as short (long) horizon investors.

\* p-values are one-tailed, given directional predictions

\*\* two-tailed equivalent

Figure 4. Generalized Representation of Financial Statement Item

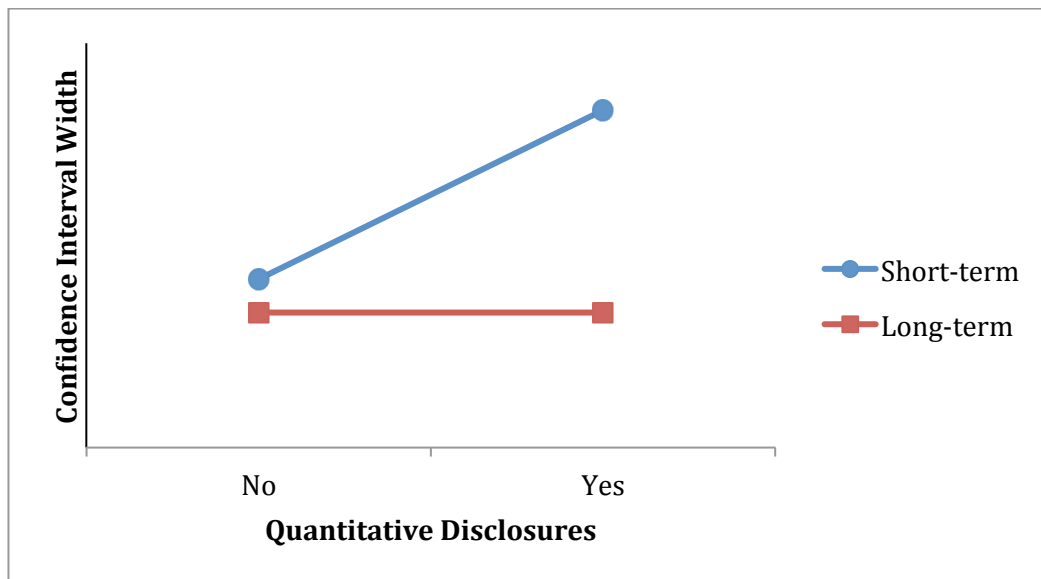


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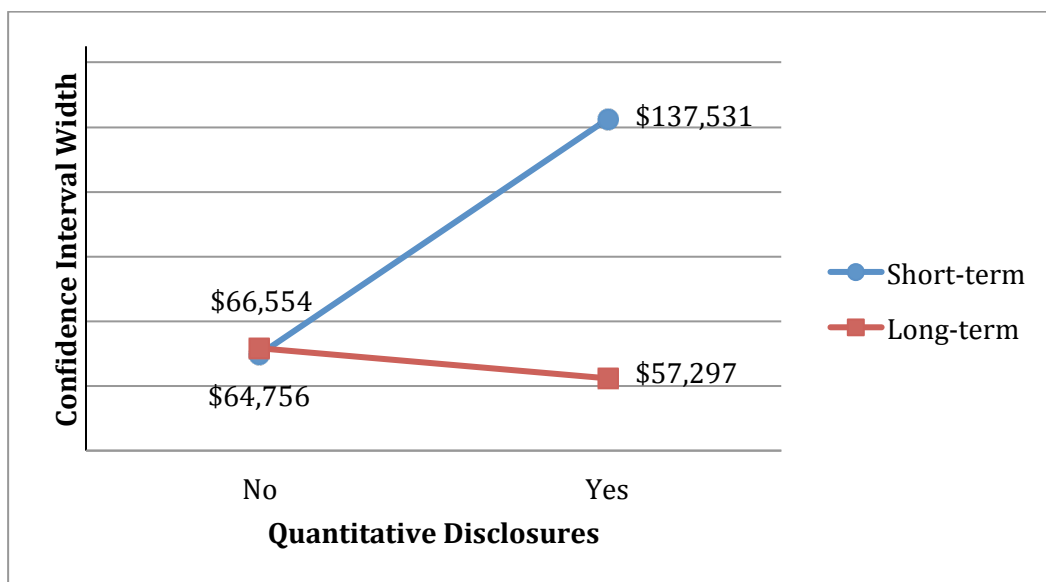
This figure (adapted from Wyer 2004) presents a metaphorical representation of the general category “financial statement item” as it might be stored in the memory of a financial statement user. Lines denote associations, with thicker lines denoting stronger associations.

Figure 5: Effect of Quantitative Disclosures and Temporal Orientation on Confidence Interval Width (H3)

Panel A: Predicted Effects



Panel B: Observed Effects



Panel A depicts the pattern consistent with the hypothesized ordinal interaction of *temporal orientation* and *quantitative disclosures* on participants' elicited confidence intervals, a measure that is inversely related to perceptions of precision (H3). The prediction in H3 maps reasonably in contrast weights of -1 +3 -1 -1 for short term/no disclosure; short term/disclosure; long term/no disclosure; long term/disclosure conditions. Panel B depicts the observed pattern of the width of elicited confidence intervals (see Table 3, Panel A). This pattern is tested using the planned contrast presented in Panel B of Table 3.

**TABLE 1**  
***Descriptive Statistics and Test of Hypothesis 1***

<b><i>Panel A: Descriptive Statistics for H1 – Participants’ precision judgment means [standard deviations]</i></b>				
	<u>Fair Value Disclosures</u>			
	<u>n</u>	<u>Level 2</u>	<u>n</u>	<u>Level 3</u>
Short Horizon				
Precision 1	23	64.74 [17.64]	22	39.14 [23.86]
Precision 2	23	56.74 [20.88]	22	40.45 [23.44]
Precision Score	23	0.38 [0.94]	22	-0.70 [1.06]
Long Horizon				
Precision 1	23	61.35 [14.39]	24	44.67 [17.34]
Precision 2	23	53.39 [18.34]	24	49.54 [21.47]
Precision Score	23	0.21 [0.77]	24	-0.32 [0.71]
<b><i>Panel B: Planned contrast coding for H1</i></b>				
	<u>df</u>	<u>F-ratio</u>	<u>p-value</u>	
Overall test [H1]:				
Level 3 disclosures will result in a greater reduction in judgments of estimate precision for short horizon investors than for long horizon investors.	1	20.98	<0.001*	
Contrast weights [+2 -3 +2 -1]				
<b><i>Panel C: Follow-up Tests of Simple Effects</i></b>				
	<u>df</u>	<u>F-ratio</u>	<u>p-value</u>	
Effect of fair value level given short horizon	1	13.05	<0.001*	
Effect of fair value level given long horizon	1	6.02	0.009*	
Effect of horizon given Level 2 disclosure	1	0.45	0.505**	
Effect of horizon given Level 3 disclosure	1	2.10	0.075*	

Participants responded to the following questions on 101-point Likert scales: Precision 1 – “How sure are you that \$267,095 is the actual fair value of ArgyleBay’s land held for development at the end of Year 3?” with endpoints 0 (“Not at all sure”) and 100 (“Very sure”). Precision 2 – “How precise is \$267,095 as a measure of the fair value of ArgyleBay’s land held for development at the end of Year 3?” with endpoints 0 (“Very imprecise”) and 100 (“Very precise”).

\* p-values are one-tailed, given directional predictions

\*\* two-tailed equivalent

**TABLE 2**  
**Descriptive Statistics and Test of Hypothesis 2a**

<i>Panel A: Descriptive Statistics – Participants’ valuation judgment means [standard deviation]</i>					
		<u>Fair Value Disclosures</u>			
	<u>n</u>	<u>Level 2</u>	<u>n</u>	<u>Level 3</u>	
Short Horizon	23	-3.09 [37.70]	22	-24.00 [22.10]	
Long Horizon	23	-12.39 [17.67]	24	-14.75 [24.07]	
<i>Panel B: Regression Model of Valuation Judgments</i>					
	<u>Short Horizon</u>		<u>Long Horizon</u>		
	<u>Coefficient</u>	<u>p-value</u>	<u>Coefficient</u>	<u>p-value</u>	
Intercept	-3.09	0.636**	-12.93	0.003*	
Level 3 Disclosures	-20.91	0.014*	-2.36	0.705**	
<i>Panel C: ANOVA Model of Valuation Judgments</i>					
<u>Source of Variation</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F-ratio</u>	<u>p-value</u>
Horizon	0.02	1	0.02	0.00	0.996**
Fair Value Level	3111.10	1	3111.10	4.44	0.019*
Horizon x FV Level	1977.64	1	1977.64	2.82	0.048*
Error	61721.80	88	701.38		
<i>Panel D: Follow-up Tests of Simple Effects</i>					
		<u>df</u>	<u>F-ratio</u>	<u>p-value</u>	
Effect of fair value level given short horizon		1	7.01	0.010*	
Effect of fair value level given long horizon		1	0.09	0.761**	
Effect of horizon given Level 2 disclosure		1	1.42	0.113*	
Effect of horizon given Level 3 disclosure		1	1.83	0.091*	

Participants assessed how the impairment recognized in ArgyleBay’s Year 3 financial statements affected the value they would place on the company. Participants responded on a Likert scale with endpoints -100 (“Greatly decreases how much I value the company”) and +100 (“Greatly increases how much I value the company”); the midpoint of the scale was labeled 0 (“Neither increases nor decreases how much I value the company”).

\* Reported p-values are one-tailed, given directional predictions

\*\* Two-tailed equivalent

**TABLE 3**  
***Descriptive Statistics and Test of Hypothesis 3***

***Panel A: Descriptive Statistics for H3 – Participants' 90% confidence interval means [standard deviation]***

Temporal orientation	Quantitative Disclosures	<i>n</i>	Upper Bound	Lower Bound	Width [Upper – Lower]
Short-term	No	15	289,508.47 [25,418.50]	224,752.33 [30,856.64]	64,756.13 [50,367.60]
Short-term	Yes	19	348,694.21 [163,951.36]	211,162.89 [67,587.53]	137,531.32 [175,206.18]
Long-term	No	19	284,932.74 [31,187.07]	218,378.42 [38,218.61]	66,554.32 [52,971.90]
Long-term	Yes	18	280,965.56 [34,074.64]	223,668.78 [49,165.81]	57,296.78 [58,575.17]

***Panel B: Planned contrast coding for H3 and follow-up simple effects tests***

Source	<i>df</i>	<i>F</i> -ratio	<i>p</i> -value
<u>Overall test [H3]:</u>			
Confidence interval width will be greatest when investors have a <i>short-term</i> temporal orientation and quantitative disclosures are <i>present</i> .	1	7.44	<0.01*
Contrast weights [-1 +3 -1 -1]			
<u>Follow-up simple effect tests:</u>			
Effect of temporal orientation given quantitative disclosures	1	5.71	0.01*
Effect of temporal orientation given no quantitative disclosures	1	0.05	0.96**
Effect of quantitative disclosures given short-term	1	4.27	0.02*
Effect of quantitative disclosures given long-term	1	0.28	0.78**

\* *p*-values are one-tailed, given directional predictions

\*\* two-tailed equivalent

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## APPENDIX A

### *Investment Horizon Manipulation*

This appendix reproduces the instructions provided to participants in short and long investment horizon conditions, respectively. In addition to these instructions, participants in short (long) horizon conditions listed three factors that would be important in predicting the performance of a short-term (long-term) investment in ArgyleBay stock and three ways in which they would use the money from their investment when they cashed it in.

#### *Part 1: Short Horizon Instructions*

In the materials that follow, you will read background and financial information about ArgyleBay Communities, Inc., a firm operating in the residential real estate industry.

Please assume that you are a prospective investor considering a **short-term** investment of \$10,000 in the residential real estate industry. Based on your analysis thus far, you have identified ArgyleBay's stock as a potential investment. You expect to hold your investment for **no more than three months**.

#### *Part 2: Long Horizon Instructions*

In the materials that follow, you will read background and financial information about ArgyleBay Communities, Inc., a firm operating in the residential real estate industry.

Please assume that you are a prospective investor considering a **long-term** investment of \$10,000 in the residential real estate industry. Based on your analysis thus far, you have identified ArgyleBay's stock as a potential investment. You expect to hold your investment for **no less than five years**.

## APPENDIX B

### *Fair Value Disclosure Manipulation*

This appendix reproduces the financial statement line items and fair value disclosures provided to participants.

#### *Part 1: Level 2 Disclosures*

<b>Income Statement</b>	
<b>(\$ in thousands)</b>	<b>Year 3</b>
Expenses:	
Impairment loss – land held for development (see note 1)	21,152
<hr/>	
<b>Balance Sheet</b>	
<b>(\$ in thousands)</b>	<b>End of Year 3</b>
Assets:	
Land held for development (fair value net of impairment loss; see note 1)	267,095

#### **Note 1**

*Assets measured at Fair Value on a Nonrecurring Basis*

(\$ in thousands)		Fair Value Measurements Using			Total Gains (Losses)
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	
Description	Fair Value at End of Year 3				
Land held for development	\$267,095		\$267,095		\$(21,152)

#### **Impairment Loss**

During the year, the Company concluded that the economic downturn and the related decline in employment levels did not support the development and construction of certain new apartment communities that were previously in planning. Accordingly, two land parcels held for development with a carrying value of \$288,247 were written down to their fair value of \$267,095, resulting in an impairment charge of \$21,152, which was included in earnings for the period. Because the valuation of the land parcels incorporated significant other observable inputs, these values are considered to be Level 2 prices in the fair value hierarchy.

*Part 2: Level 3 Disclosures*

<b>Income Statement</b>	
<b>(\$ in thousands)</b>	<b>Year 3</b>
Expenses:	
Impairment loss – land held for development (see note 1)	21,152
<hr/>	
<b>Balance Sheet</b>	
<b>(\$ in thousands)</b>	<b>End of Year 3</b>
Assets:	
Land held for development (fair value net of impairment loss; see note 1)	267,095

**Note 1**

*Assets measured at Fair Value on a Nonrecurring Basis*

<b>(\$ in thousands)</b>		<b>Fair Value Measurements Using</b>			<b>Total Gains (Losses)</b>
		<b>Quoted Prices in Active Markets for Identical Assets (Level 1)</b>	<b>Significant Other Observable Inputs (Level 2)</b>	<b>Significant Unobservable Inputs (Level 3)</b>	
<b>Description</b>	<b>Fair Value at End of Year 3</b>				
Land held for development	\$267,095			\$267,095	\$(21,152)

**Impairment Loss**

During the year, the Company concluded that the economic downturn and the related decline in employment levels did not support the development and construction of certain new apartment communities that were previously in planning. Accordingly, two land parcels held for development with a carrying value of \$288,247 were written down to their fair value of \$267,095, resulting in an impairment charge of \$21,152, which was included in earnings for the period. Because the valuation of the land parcels incorporated significant unobservable inputs, these values are considered to be Level 3 prices in the fair value hierarchy.

**Valuation Technique**

The internal model used to generate the fair value of the land parcels employed an expected present value technique. The model used a set of probability-weighted future cash flows to generate a single stream of expected cash flows. These expected cash flows were then adjusted using a risk-adjusted discount rate. The discount rate used in generating the fair value of the impaired land parcels was the Company's estimated weighted average cost of capital (WACC) at the balance sheet date. The WACC is a weighted average of the Company's cost of equity capital, estimated using the capital asset pricing model (CAPM), and the Company's after-tax incremental borrowing rate for long-term debt. This valuation technique is the same as techniques used to measure similar assets in prior periods.

## APPENDIX C

### *Supplemental Experiment Quantitative Disclosure Manipulation*

This appendix reproduces the note disclosure provided to participants in *quantitative disclosure (provided)* conditions. Participants in the *quantitative disclosure (not provided)* conditions received identical materials, except that details of the discounted cash flow analysis were omitted.

#### Note 1

During 2009 the Company concluded that the economic downturn and the related decline in employment levels did not support the development and construction of certain new apartment communities that were previously in planning. This resulted in impairment charges of \$21,152 related to the impairment of land which the Company holds for development. The fair value of \$267,095 was generated using a discounted cash flow analysis on expected cash flows. This analysis incorporated significant unobservable inputs and is therefore considered to be a Level 3 price in the fair value hierarchy.

Details of the discounted cash flow analysis used to generate the fair value of \$267,095 are shown below:

(in thousands)	2010	2011	2012	2013	2014	2015-2025
<b>Cash Revenues</b>	39,040	117,510	236,196	356,656	449,386	859,055
<b>Expenses</b>	34,160	102,822	206,671	312,074	393,213	751,674
<b>Non-cash expenses</b>	9,760	26,378	59,049	89,164	112,347	214,764
<b>Operating Cash Flows</b>	14,640	44,066	88,573	133,746	168,520	322,146
<b>Capital Expenditures</b>	102,510	52,280	26,663	13,598	6,935	34,814
<b>Free Cash Flows (FCF)</b>	(87,870)	(8,214)	61,911	120,148	161,585	287,332
<b>Discount rate*</b>	0.0977	0.0977	0.0977	0.0977	0.0977	0.0977
<b>Present Value of FCF</b>	(80,049)	(6,817)	46,806	82,750	111,289	113,114

\*\* The discount rate is the Company's estimated weighted average cost of capital (WACC):

$$WACC = \left[ \frac{D}{D + E} * R_d * (1 - T) \right] + \left[ \frac{E}{D + E} * R_e \right]$$

Where:

D = Estimated market value of long-term debt

E = Estimated market value of equity

R<sub>d</sub> = Incremental long-term borrowing rate of 6%

R<sub>e</sub> = Cost of equity, estimated at 12.38% using the capital asset pricing model with a risk-free interest rate of 2.86%, a risk premium of 7%, and a beta parameter of 1.36.

T = Effective corporate tax rate of 35%